

182-9.

BROOKLYN FIRE BRICK WORKS



Refractories

BROOKLYN FIRE BRICK WORKS

ESTABLISHED 1854

Manufacturers of
High Grade Refractories

Fire Brick and Special Shapes
for Power Plants and the Metal-
lurgical, Chemical and Enamel-
ing Industries

WORKS
Van Dyke, Beard and
Richards Streets
BROOKLYN, N. Y.

OFFICE
88 Van Dyke Street
BROOKLYN, N. Y.

IT is becoming generally admitted that the refractoriness of a fire brick is not the best method of measuring its effectiveness.

Many types of highly refractory brick when ground to a powder for temperature tests develop a long range through which, due to the viscous nature of the material when fused do not show sufficient failure to indicate fusion until a temperature that is unduly high has been reached.

On the other hand when these brick are subjected to a load test—which is coming to be considered the test most simulative of operating conditions—an actual failure develops.

In the case of the Siliceous Woodbridge and Raritan Clays the range of temperature over which the surface of these clays vitrify is comparatively short, while their fusion points as indicated in the analyses on pages 3 and 4 are high. In the load test, therefore, our products show very good results because there is practically no change in their structure at the load test temperature.

The result of this is that we have many instances where our materials have replaced refractories having higher fusion points because of the inability of the latter to withstand pressures at working temperatures.

Introductory

THIS company's products are manufactured from the justly famed Raritan and Woodbridge clays found in New Jersey. These clays are highly siliceous in character.

The important features of these clays are that while they have substantially as high fusion points as flint or aluminous clays, they do not have the long range of vitrification and consequently do not soften at working temperatures. In other words they will carry heavy loads and will perform their work under pressures at temperatures near their fusion point. Obviously such service cannot be obtained from brick that begin to soften at temperatures much below their stated fusion temperature.

An additional and equally valuable feature of the Jersey clays is that they produce brick remarkably true to shape that have sharp, well defined and strong edges, and that have a comparatively low specific gravity. Brick made from these clays weigh only eighty per cent as much as flint clay brick.

It is in the joints of brickwork that disintegration and failure start. The BROOKLYN brands of brick are so true to shape that very thin joints can be built. These thin joints and sharp square edges of the brickwork combine to make very solid walls that give the longest possible service. The low specific gravity makes a smaller amount of the first cost of the brick chargeable for the transportation.

Typical analyses of some of the clays used in the manufacture are submitted below:

Silica Clay Analysis

Ignition.....	13.54%
Silica.....	60.10%
Alumina.....	23.15%
Iron Oxide.....	1.30%
Titania.....	1.38%
Lime.....	.52%
Magnesia.....	.65%
Alkalies.....	Trace
Fusion Point.....	3254° F.

Plastic Clay Analysis

Contents

Ignition Loss.....	13.96%
Silica.....	44.34%
Alumina.....	39.20%
Iron Oxide.....	1.23%
Titania.....	1.11%
Lime.....	.23%
Magnesia.....	.77%
Alkalies.....	Trace
Fusion Point.....	3290° F.

Typical analysis of our "BROOKLYN" Brand is given below:

Analysis "BROOKLYN" Brick

Contents

Silica.....	70.58%
Alumina.....	24.10%
Iron Oxide.....	1.49%
Titania.....	3.05%
Lime.....	.09%
Magnesia.....	.24%
Alkalies.....	.55%
Fusion Point.....	3125° F.
Compression in Standard 1350° C. load test of 25 lbs. per sq. in.....	2.48%

Allowable Shrinkage 4 Per Cent.

The kiln capacity of our plant is such that any demand made can be properly and promptly attended to. We carry in stock at all times a very large and varied assortment of fire brick and special shapes.

Our Engineering Service Department will gladly co-operate at all times in the solving of fire brick problems, and where a particular problem is encountered will design such brick or refractory shapes as will be most suitable.

We take this means of thanking our large number of customers for their continuous patronage and solicit a continuance of this patronage with the assurance of careful attention and prompt service at all times.

Quotations will be gladly submitted covering any special requirements for fire brick or special refractories.

The products of this Company are made under two brands, each to meet special service requirements.



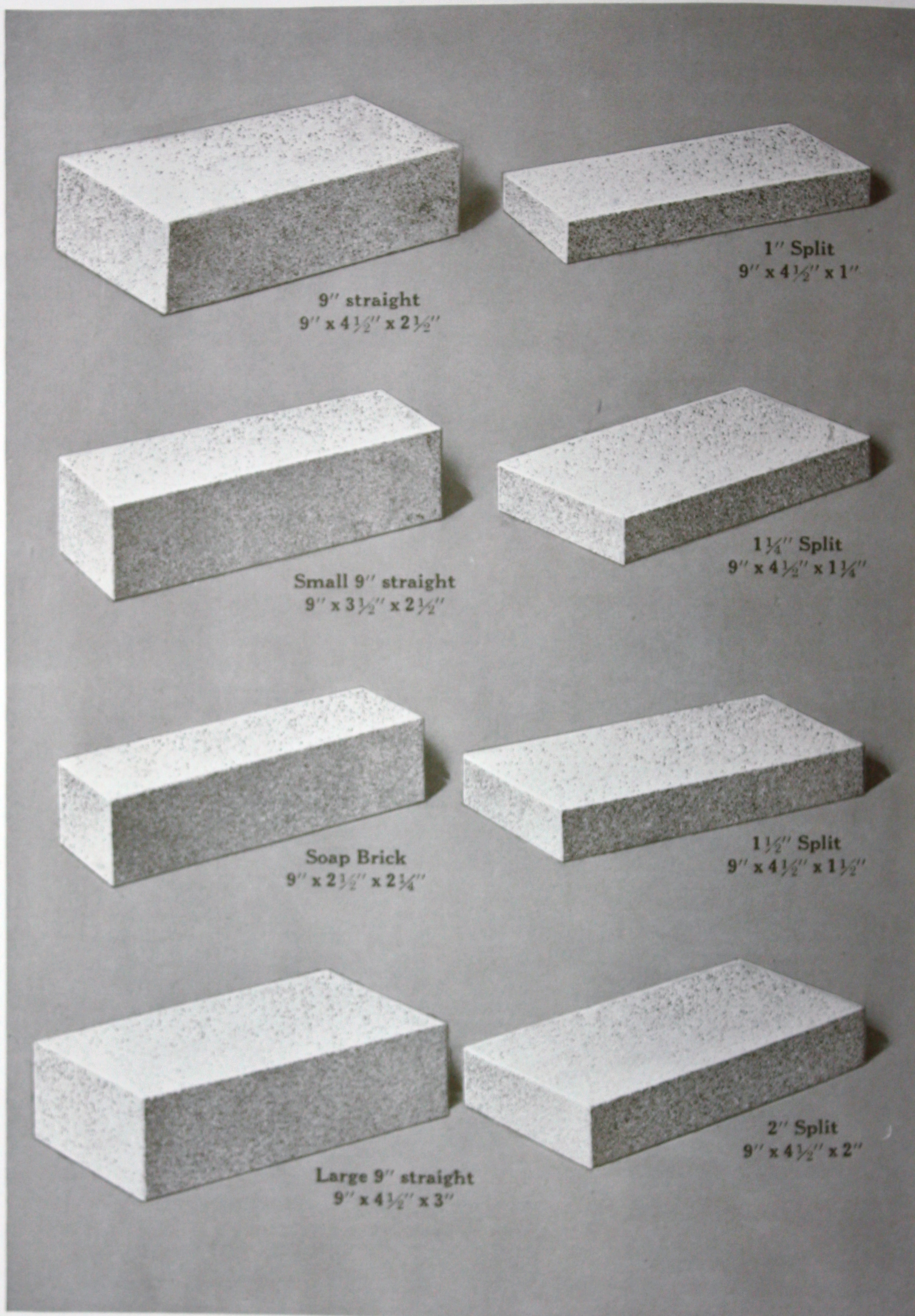
Fusion Point 3125° F.

"BROOKLYN" for services where extreme changes of temperature take place and for all general first quality refractory practice



Fusion Point 3254° F.

Diamond S. M. for severe conditions where slagging actions are encountered with high temperatures. It has an extremely high fusion point



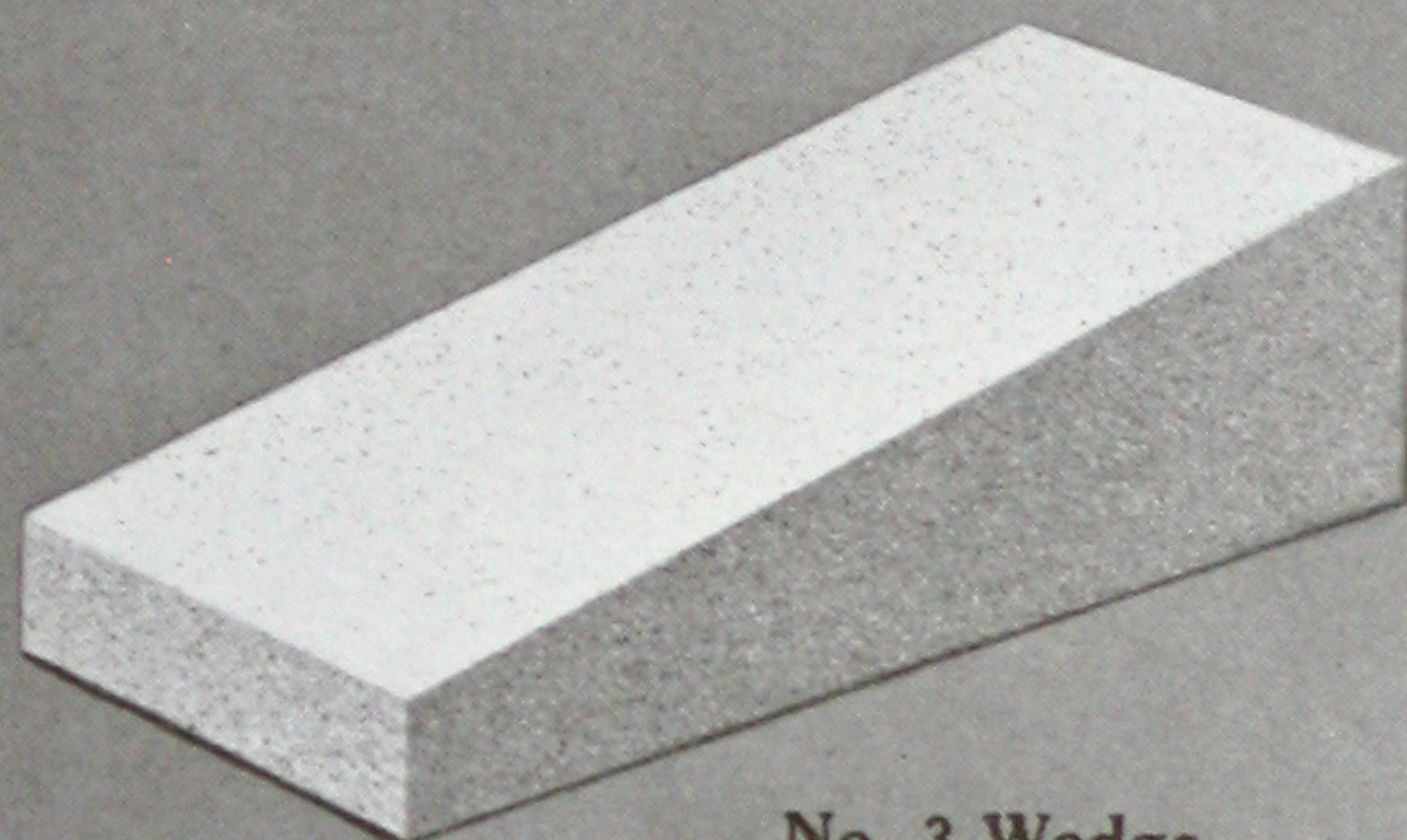
STANDARD SHAPES



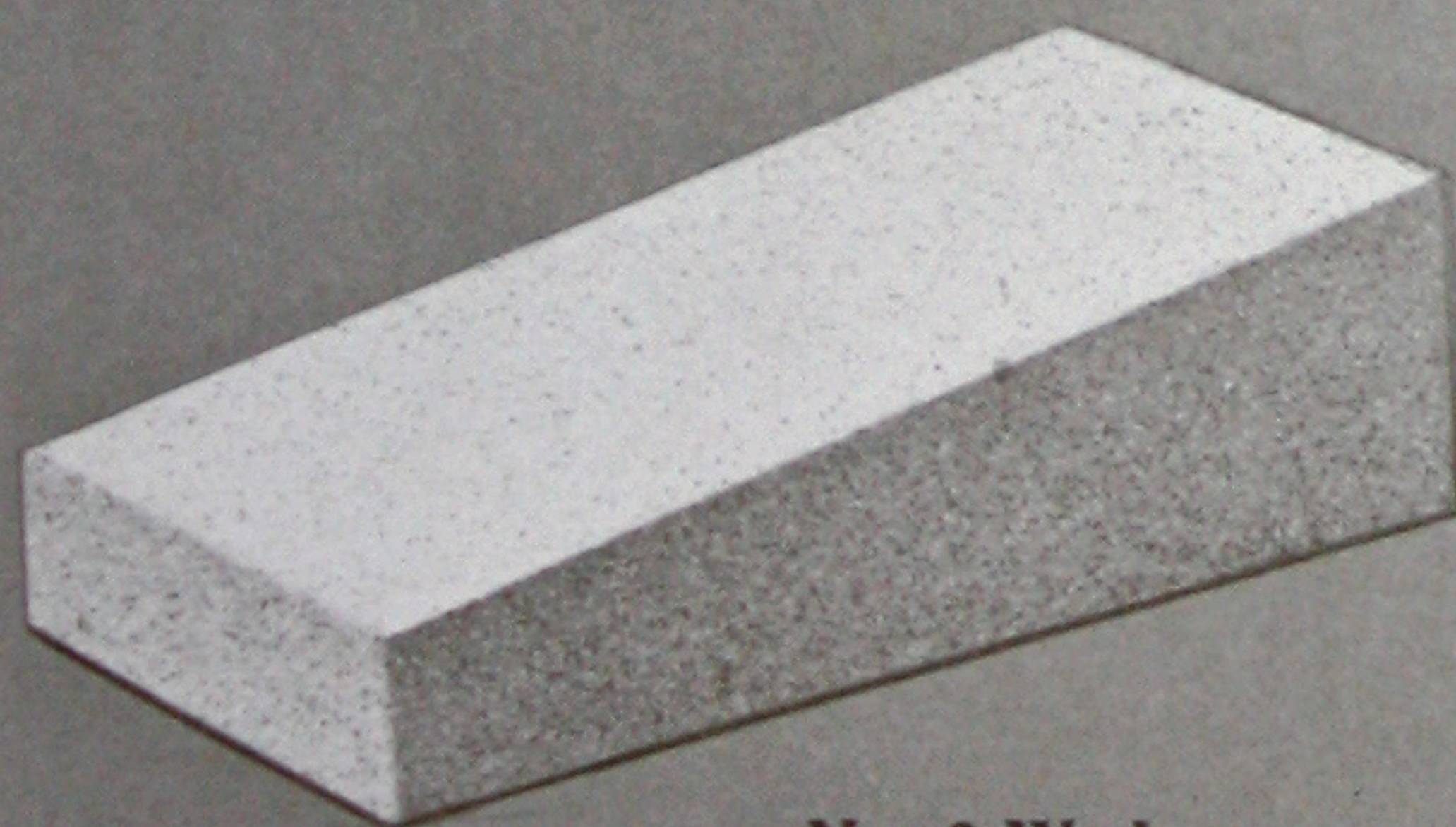
No. 1 Wedge
9" x 4 1/2" x (2 1/2" x 2")



No. 4 Wedge
9" x 4 1/2" x (2 1/2" x 7/8")



No. 3 Wedge
9" x 4 1/2" x (2 1/2" x 1 1/4")

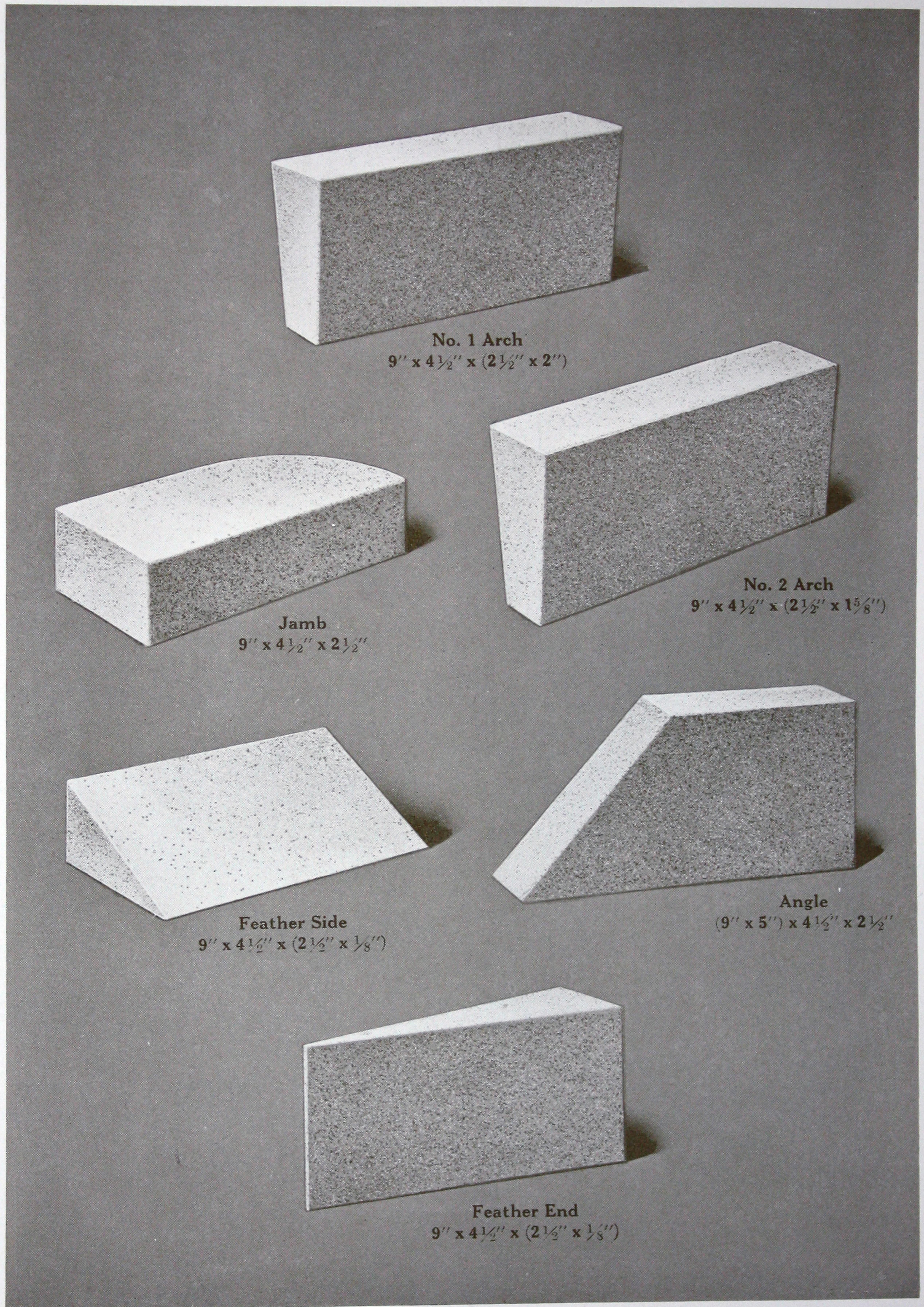


No. 2 Wedge
9" x 4 1/2" x (2 1/2" x 1 1/2")



No. 5 Wedge
9" x 4 1/2" x (2 1/2" x 2 1/4")

STANDARD SHAPES



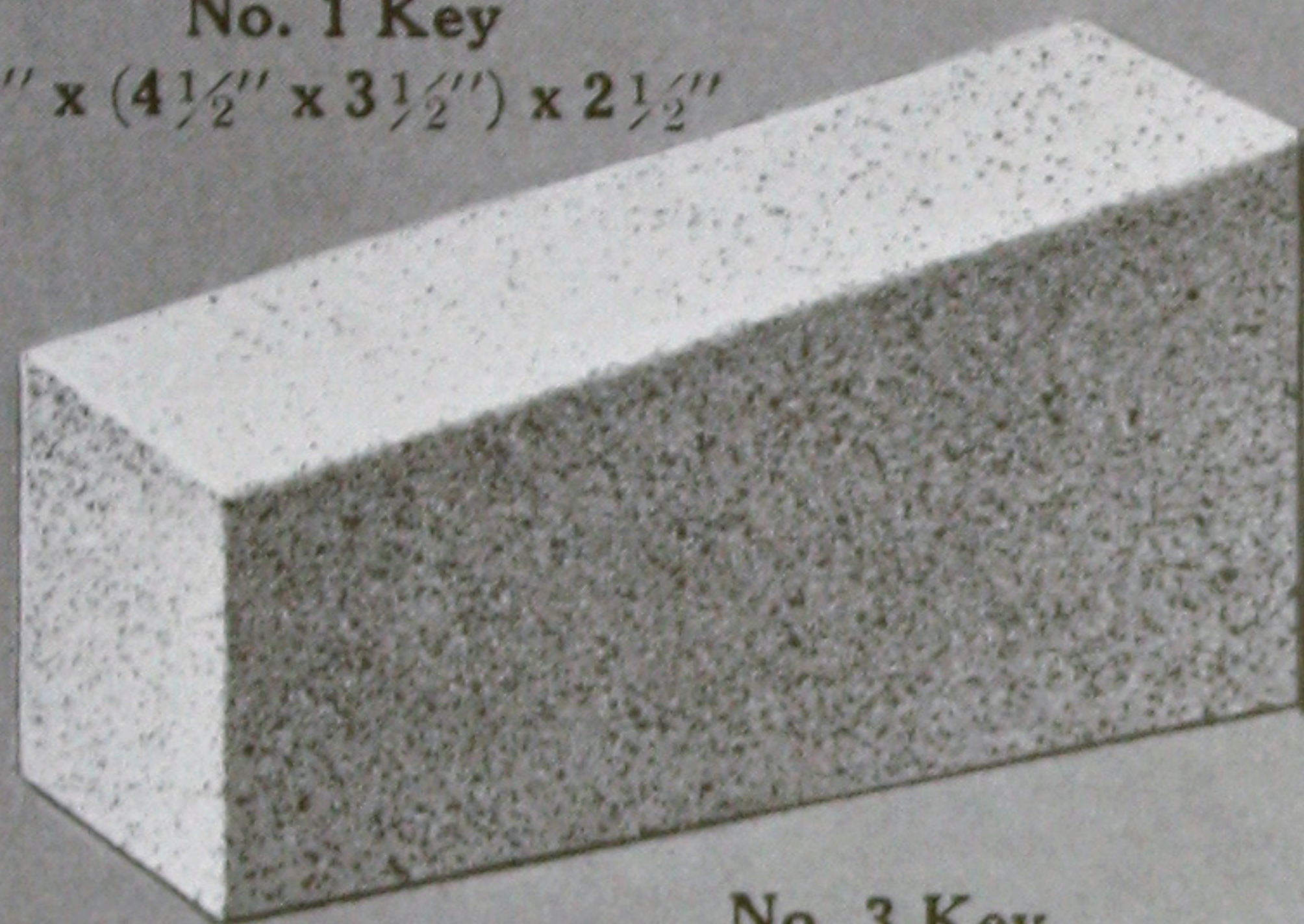
STANDARD SHAPES



No. 1 Key
9" x (4 1/2" x 3 1/2") x 2 1/2"



No. 2 Key
9" x (4 1/2" x 3") x 2 1/2"



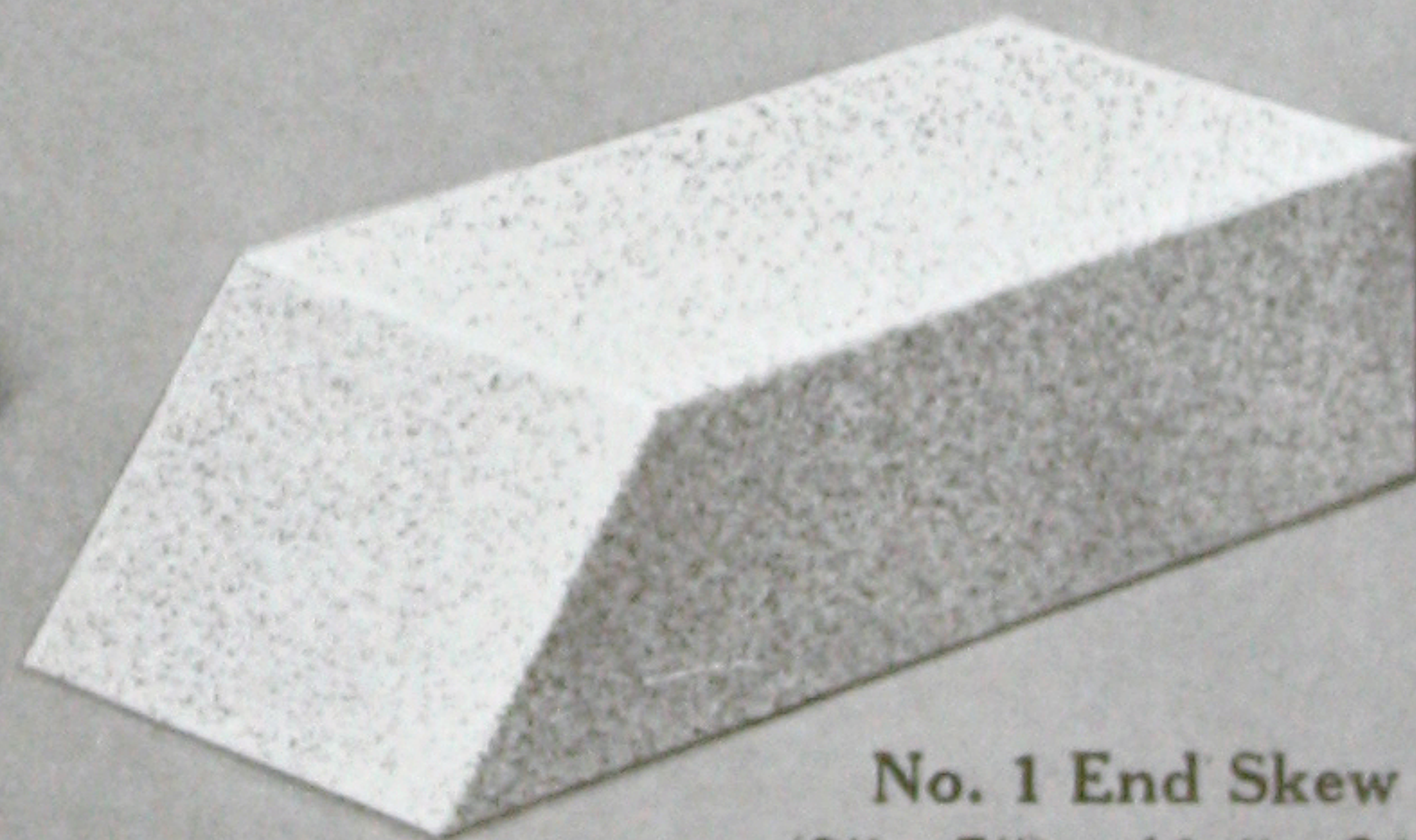
No. 3 Key
9" x (4 1/2" x 2 3/4") x 2 1/2"



No. 4 Key
9" x (4 1/4" x 2 1/4") x 2 1/2"



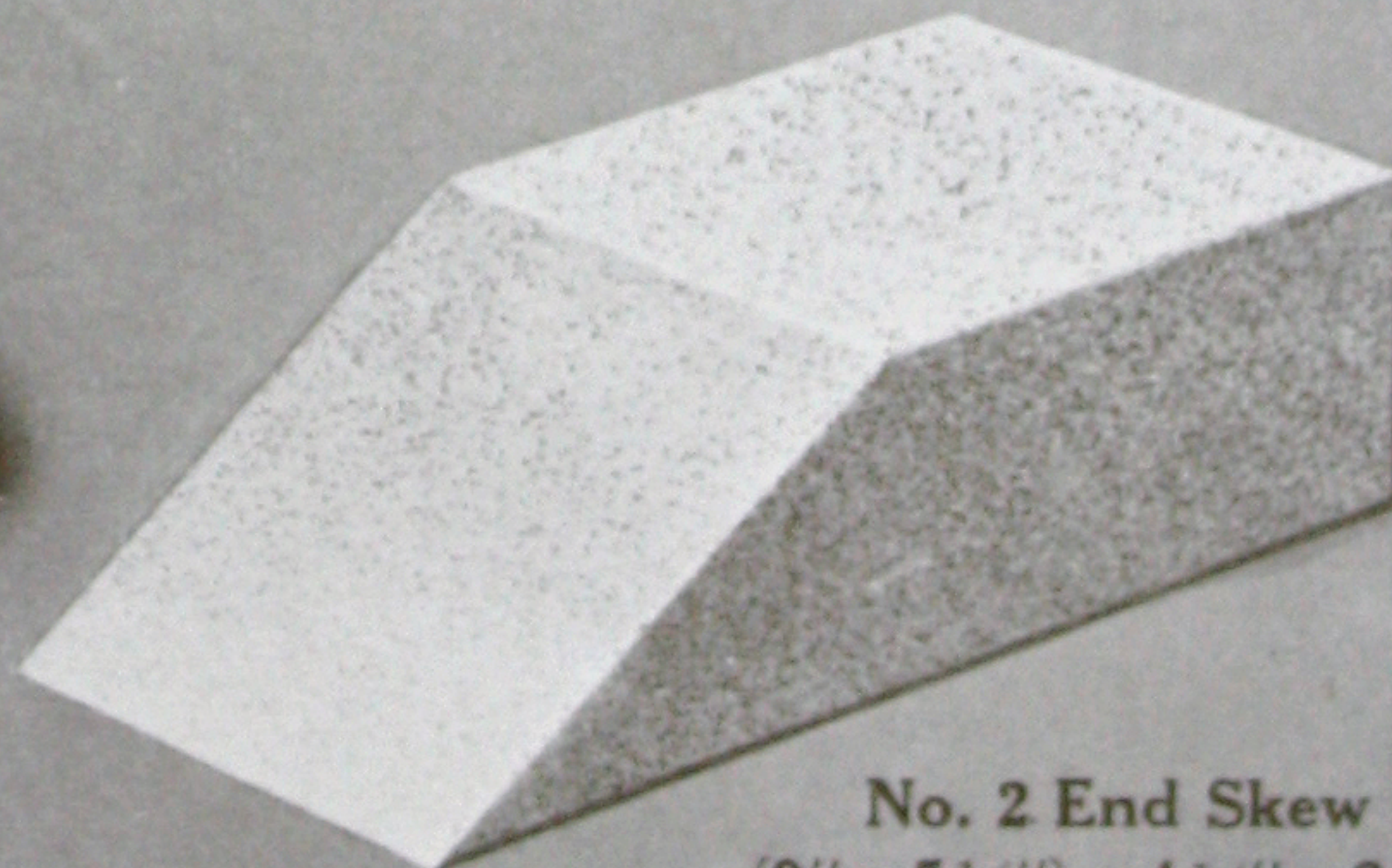
No. 1 Side Skew
9" x (2 1/2" x 4 1/2") x 2 1/2"



No. 1 End Skew
(9" x 7") x 4 1/2" x 2 1/2"

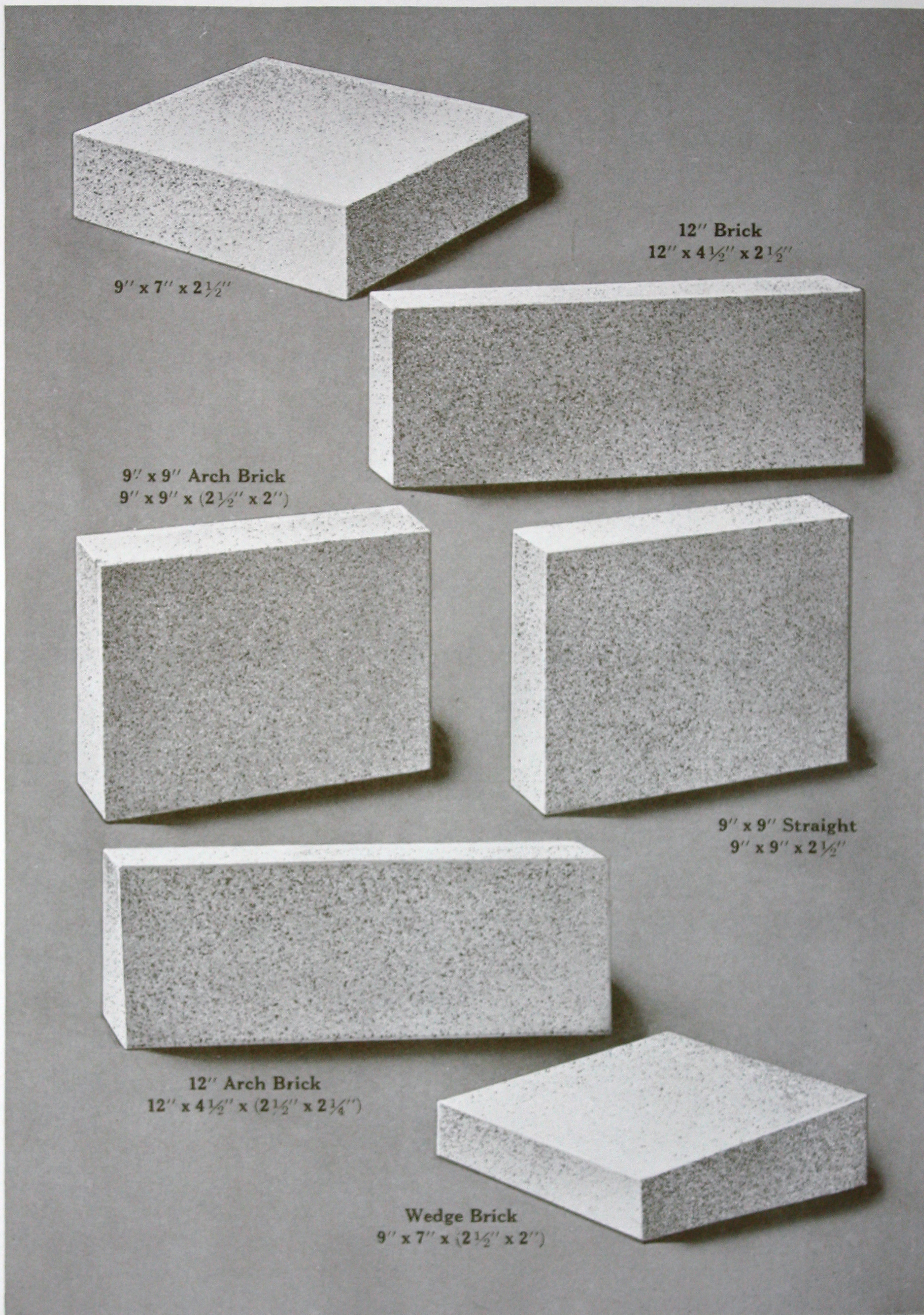


No. 2 Side Skew
9" x (1" x 4 1/2") x 2 1/2"



No. 2 End Skew
(9" x 5 1/2") x 4 1/2" x 2 1/2"

STANDARD SHAPES



STANDARD SHAPES LARGER THAN 9"

B R O O K L Y N F I R E B R I C K W O R K S

3"—Cont.

20" x 18"
24" x 18"
26" x 18"
36" x 18"
20" x 20"
24" x 20"
28" x 20"
30" x 20"
22" x 22"
24" x 24"

3½"

24" x 10"
28" x 10"
20" x 12"
24" x 12"
28" x 12"
30" x 12"
26" x 14"
30" x 14"
30" x 15"
28" x 18"

4"

14" x 6"
16" x 6"
18" x 6"
20" x 6"
22" x 6"
24" x 6"
26" x 6"
15" x 8"
16" x 8"

18" x 8"

20" x 8"

24" x 8"

28" x 8"

15" x 9"

16" x 9"

18" x 9"

20" x 9"

24" x 9"

28" x 9"

32" x 9"

36" x 9"

38" x 9"

15" x 10"

16" x 10"

18" x 10"

20" x 10"

24" x 10"

26" x 10"

28" x 10"

30" x 10"

12" x 12"

14" x 12"

16" x 12"

18" x 12"

20" x 12"

22" x 12"

24" x 12"

26" x 12"

28" x 12"

30" x 12"

32" x 12"

36" x 12"

16" x 14"

18" x 14"

20" x 14"

24" x 14"

26" x 14"

28" x 14"

32" x 14"

36" x 14"

38" x 14"

18" x 15"

20" x 15"

28" x 15"

30" x 15"

36" x 15"

16" x 16"

20" x 16"

24" x 16"

28" x 16"

30" x 16"

36" x 16"

18" x 18"

20" x 18"

22" x 18"

24" x 18"

26" x 18"

28" x 18"

32" x 18"

36" x 18"

20" x 20"

24" x 20"

26" x 20"

30" x 20"

24" x 24"

30" x 24"

30" x 30"

5"

10" x 5"

20" x 9"

20" x 10"

22" x 10"

24" x 10"

26" x 10"

18" x 12"

20" x 12"

24" x 12"

20" x 14"

30" x 15"

30" x 18"

6"

20" x 6"

12" x 12"

18" x 12"

20" x 12"

24" x 12"

30" x 12"

36" x 12"

20" x 14"

30" x 14"

30" x 18"

20" x 20"

9"

18" x 9"

36" x 9"

12" x 12"

18" x 12"

24" x 12"

Flanged Tile

For Gas Tight Floors and Walls

2"

18" x 12"

20" x 12"

24" x 12"

2½"

24" x 12"

18" x 18"

3"

15" x 12"

16" x 12"

18" x 12"

20" x 12"

18" x 18"

24" x 12"

24" x 14"

30" x 12"

3½"

24" x 16"

30" x 12"

4"

24" x 12"

24" x 14"

24" x 16"

30" x 12"

30" x 14"

32" x 12"

36" x 12"

5"

30" x 12"

30" x 18"

Decorating Kiln Tile

We carry in stock curved and flat, panelled and plain, tongued and grooved tile for these kilns in the following sizes:

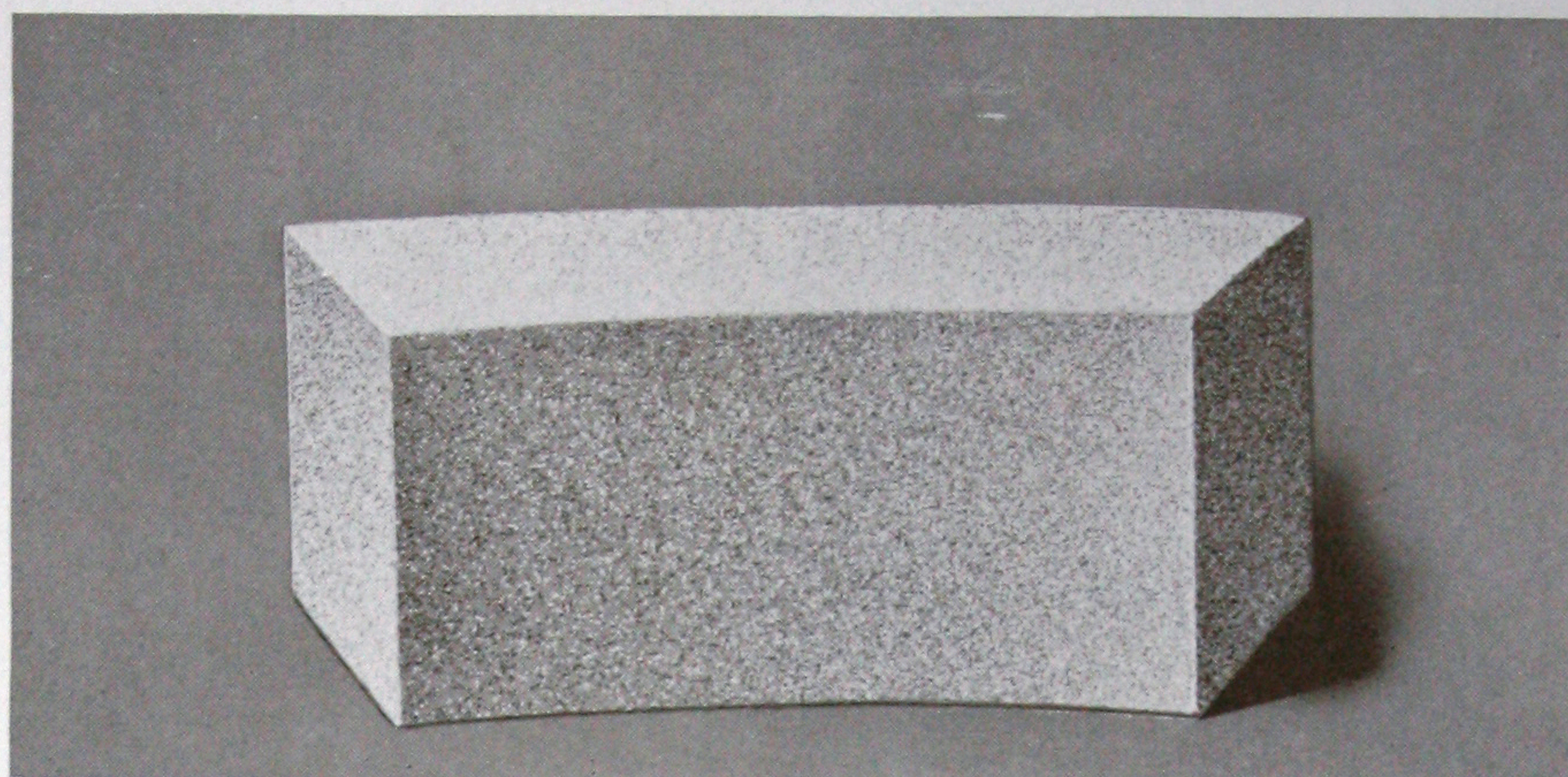
16" x 6" x 1½"

16" x 10" x 1½"

16" x 10" x 2"



TYPES OF STRAIGHT, FLANGED AND CURVED TILE



Cupola Furnace Linings

A large and complete stock of blocks for this purpose is carried in stock in the sizes shown below. Our blocks give the best service in the melting zones of these furnaces due to their hard, impervious structure at high temperatures. The short range of vitrification and high fusion point of our material make it the most suitable and most economical for this service.

Cupola Blocks

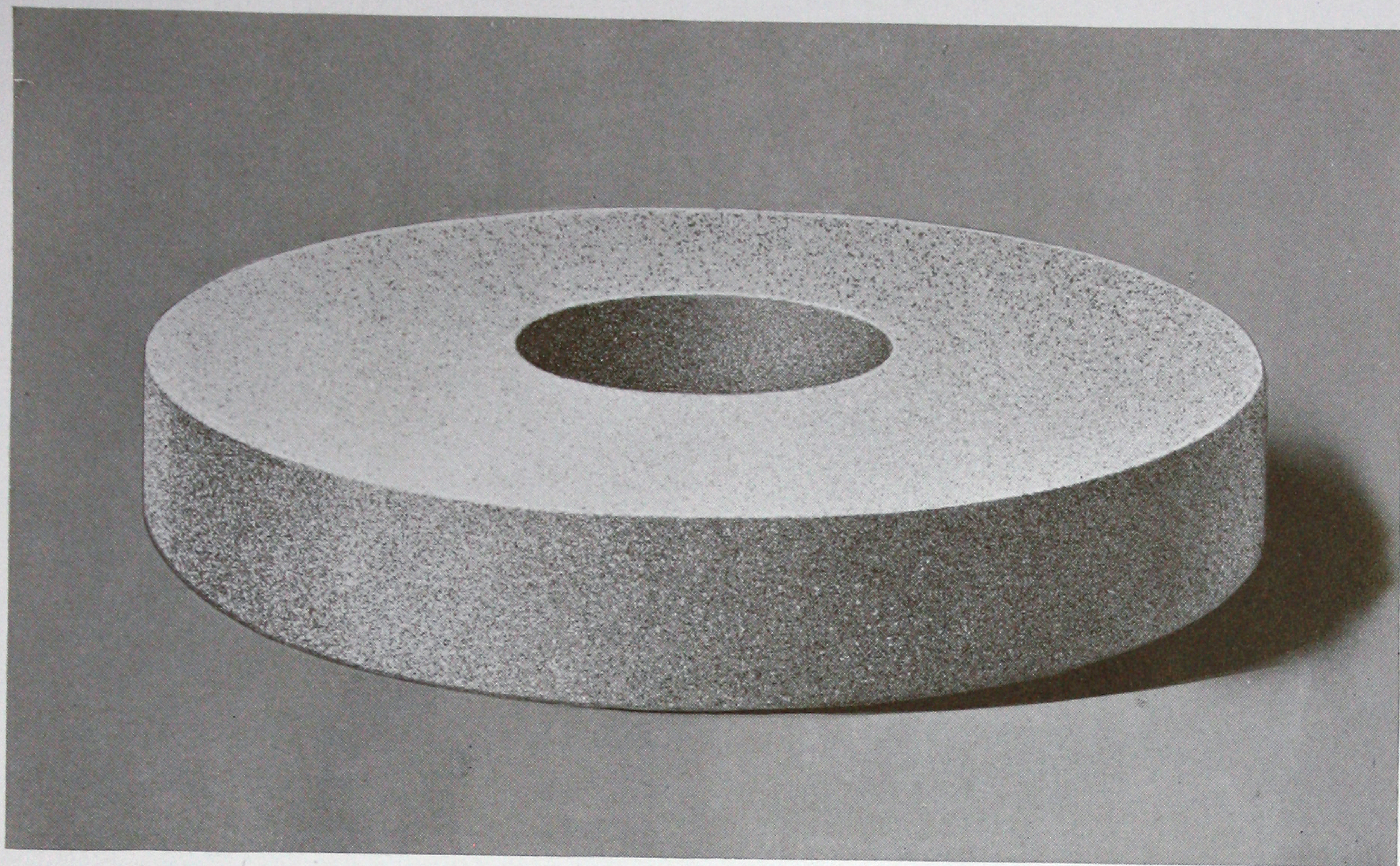
Blocks 4" Wide, 6" High

Inside Diameter Inches	Outside Diameter Inches	Blocks to a Circle
16	24	6
18	26	8
20	28	8
22	30	9
24	32	9
26	34	10
28	36	11
30	38	12
36	44	13
42	50	15

Blocks 6" Wide, 4" High

Inside Diameter Inches	Outside Diameter Inches	Blocks to a Circle
30	42	12
36	48	13
42	54	15
48	60	18
54	66	20
60	72	20
62	74	20
70	82	26

The above sizes are carried in stock. Other sizes made to order.



Brass Furnace Blocks, Rings and Covers

Blocks

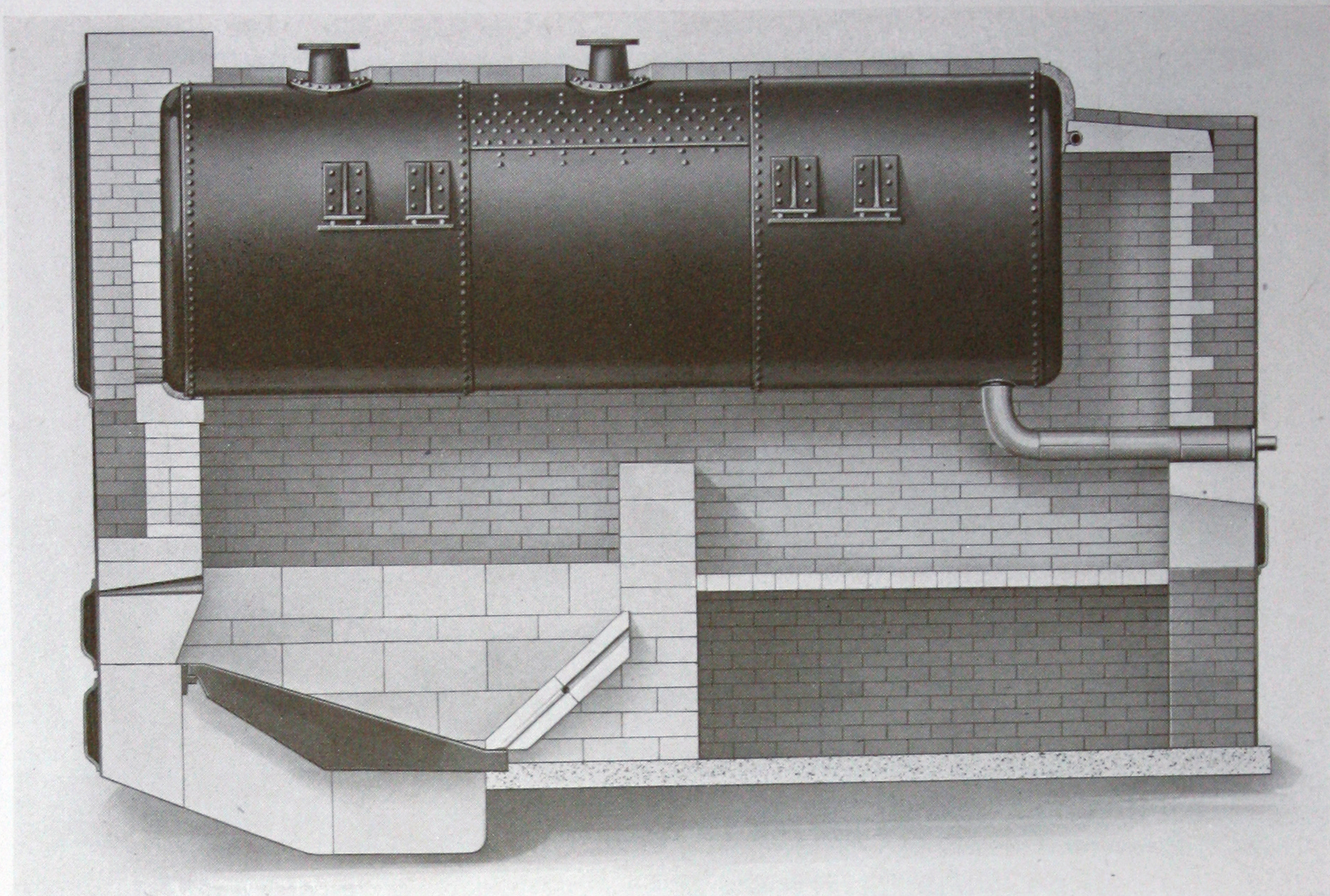
Inside Diameter Inches	High Inches	Thick Inches	To a Circle	Inside Diameter Inches	High Inches	Thick Inches	To a Circle
10	10	3	4	15	9	3	4
12	12	3	4	16	9	3	4
12	10	4	4	17	10	4	4
12	9	3	4	18	10	3	4
14	12	3	4	18	10	3½	4

Rings

21" Outside Diameter, 15" Inside Diameter, 3" Thick, three section 26" High
 25" Outside Diameter, 17" Inside Diameter, 4" Thick, three section 29" High

Covers

18" Outside Diameter, 3" Thick, 6" Center Hole
 20" Outside Diameter, 3" Thick, 6" Center Hole
 20" Outside Diameter, 4" Thick, 6" Center Hole
 21" Outside Diameter, 4" Thick, 6" Center Hole
 22" Outside Diameter, 4" Thick, 6" Center Hole
 24" Outside Diameter, 4" Thick, 6" Center Hole



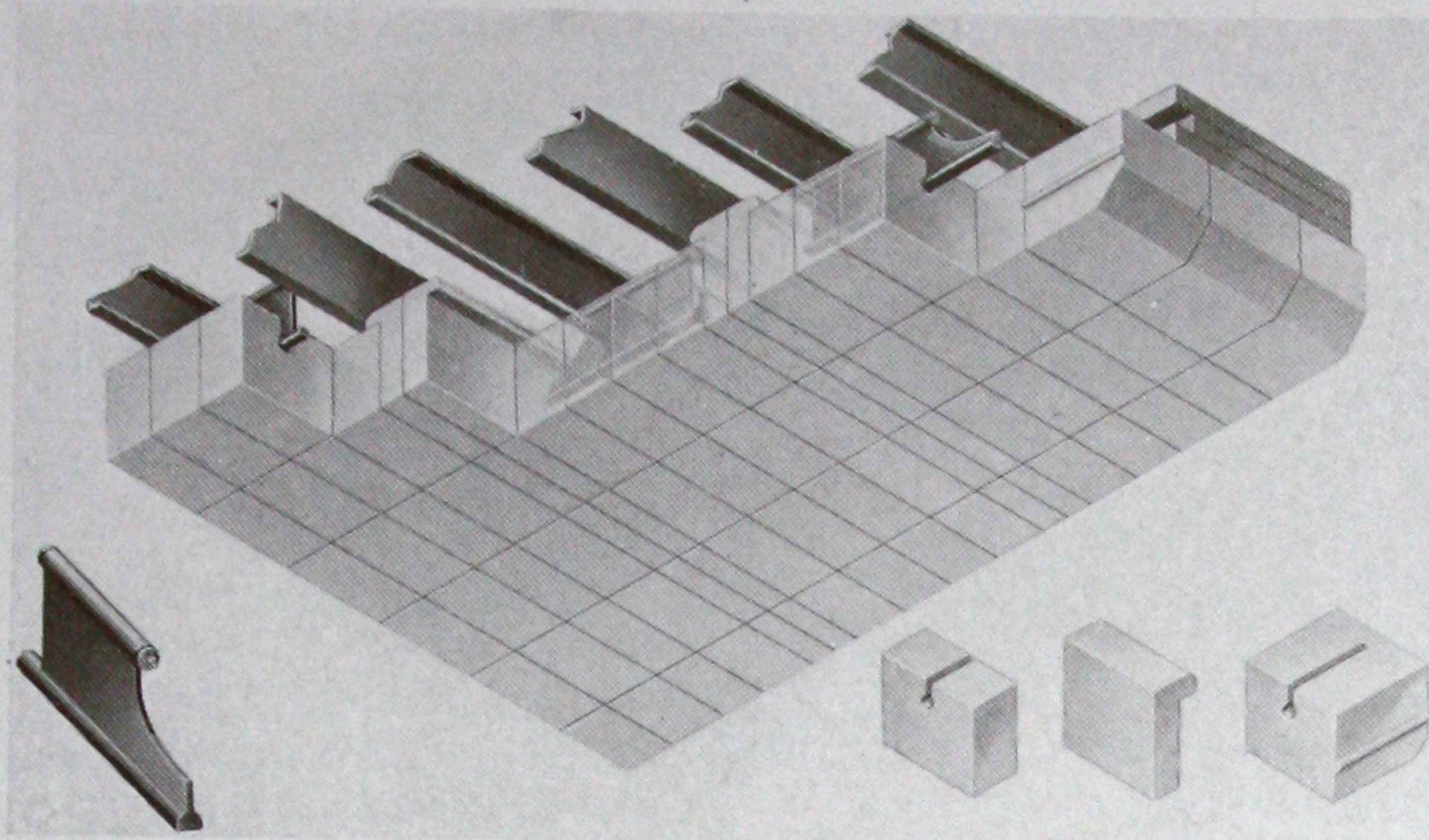
HORIZONTAL RETURN TUBULAR BOILER LINING WITH SLOPING GRATE

Refractories for Boiler Settings

THIS company's stock of boiler lining refractories is the most complete carried by any manufacturer. It consists of suspended arches, door settings, clinker proof sidewall blocks, bridge wall blocks, blow-off pipe protector coverings, air cooled back connection arches, interlocking arch brick and blocks, interlocking side wall brick and soot cleaner blocks for water tube boilers.

All of these shapes are carried in our DIAMOND SM grade material which has been found most successful in eliminating the destructive results from the clinkering of sulphurous bituminous coals. The *short vitrification range* of our brick reduces the temperature zone in which our materials soften to a few degrees from its fusion point. It is in the vitrification range that fire brick absorb clinker. Obviously the brick with the shortest vitrification range is the best brick for high temperature operation.

The wonderful durability of our material under extreme boiler conditions and the great adaptability of our clays to special shapes and their extremely long life fully warrant the higher first cost.



THE BROOKLYN Suspended Arch, as illustrated above, is furnished complete with all necessary overhead supports. This arch can be installed wherever a covering or an arch is required over a furnace. It is furnished in either flat or curved types. It can be readily repaired from the fire box side, no removal of overhead structures or covers being required. These blocks are the only ones designed with a round slot and hanger. This serves to distribute the load evenly and to diminish undue strains or stresses in the blocks. It is an entirely suspended arch. It can be set up absolutely flat and perfectly tight and no side supports are required. Quotations can be furnished upon application. The span of the arch determines the size and strength of the superstructure and the cost is dependent on this. Some of our installations of this type have been in service for seven years with scarcely a block replaced.

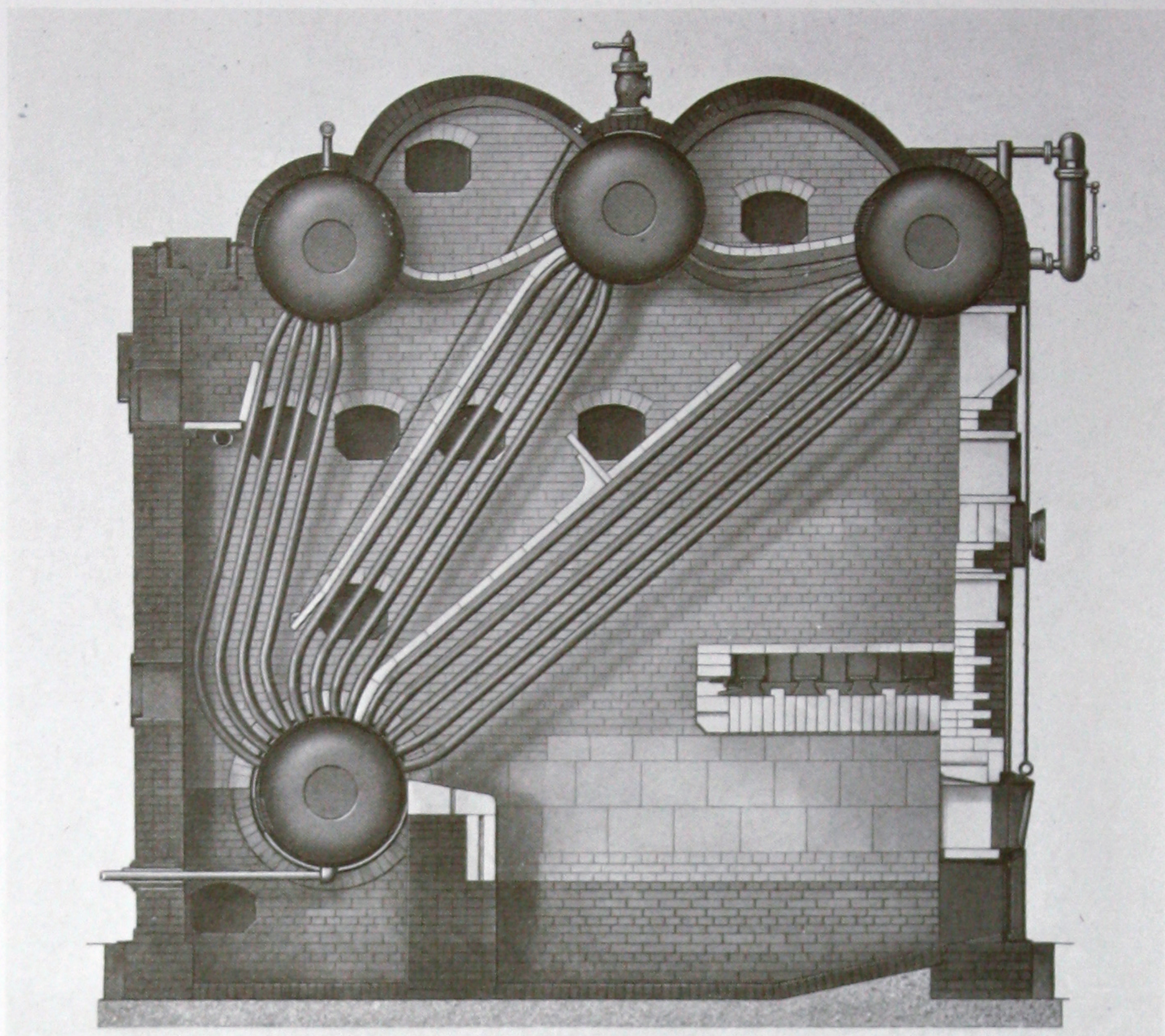
The BROOKLYN FIRE BOX SIDEWALL BLOCKS are carried in the following sizes in nine-inch and six-inch thicknesses.

24" long x 12" high
18" long x 12" high
12" long x 12" high

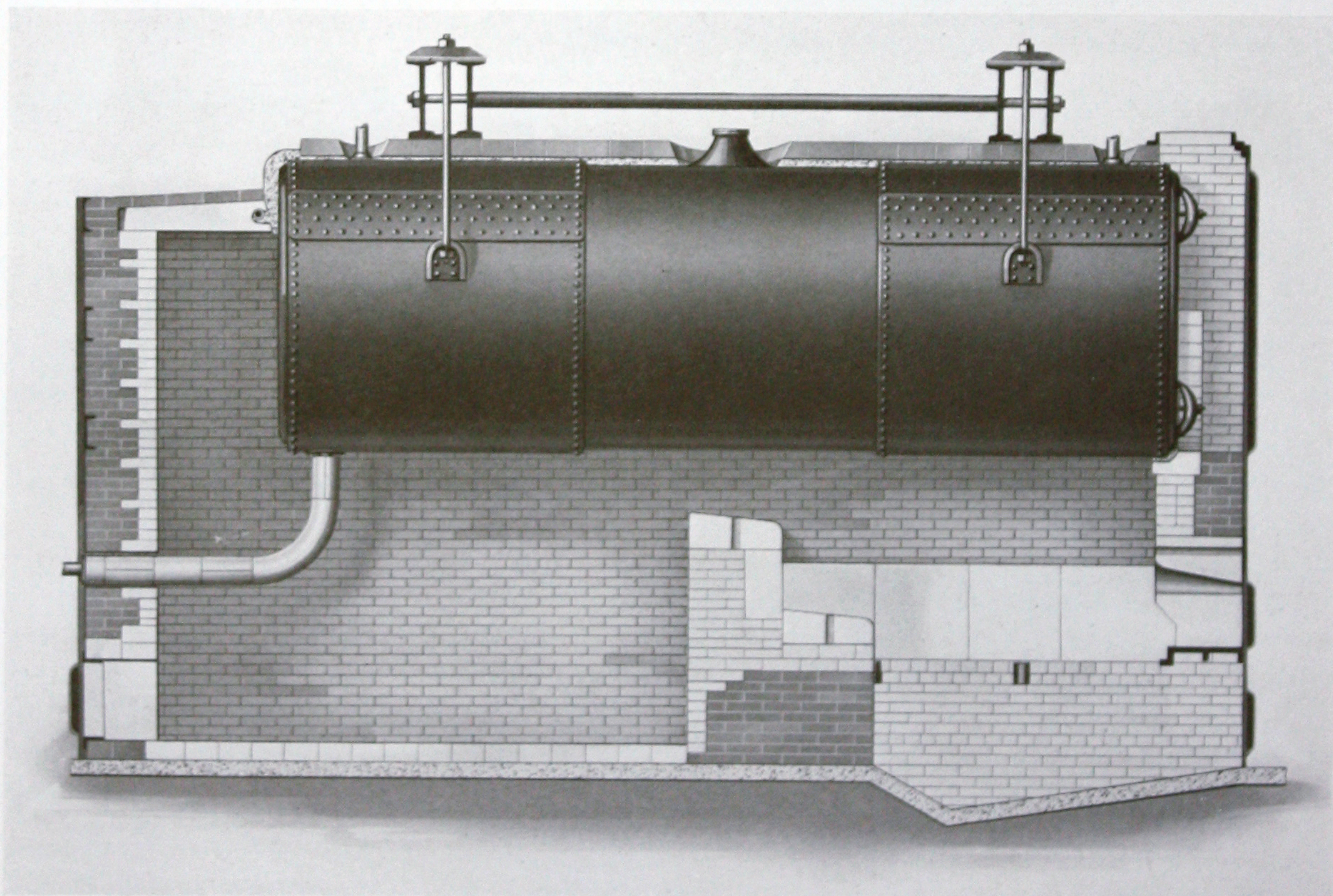
24" long x 18" high
18" long x 18" high
12" long x 18" high

The use of these blocks eliminates joints and this tends to lengthen the life of the lining. Joints are usually made too thick for good service, no matter how much care is used. These blocks, as illustrated on page 20, give service far greater than ordinary fire brick linings. They are particularly advantageous in the clinker zone of stoker fired equipment.

BROOKLYN BRIDGE WALL BLOCKS illustrated on page 23 are furnished in two types, the vertical type for use with flat grates and the sloping type for use with sloping grates. The former consist of blocks similar to the sidewall blocks and of the same material on which is mounted round faced interlocking cleaning table blocks. The sloping type consists of two rows of blocks either twelve, eighteen or twenty-four inches in length with one end cut to an angle of 45 degrees so that the blocks will form a right angle to the sloping grate. This bridgewall then acts to refract the heat of the gases rising from the fire to the forward end of the boiler or the tubes.



WATER TUBE BOILER LINING

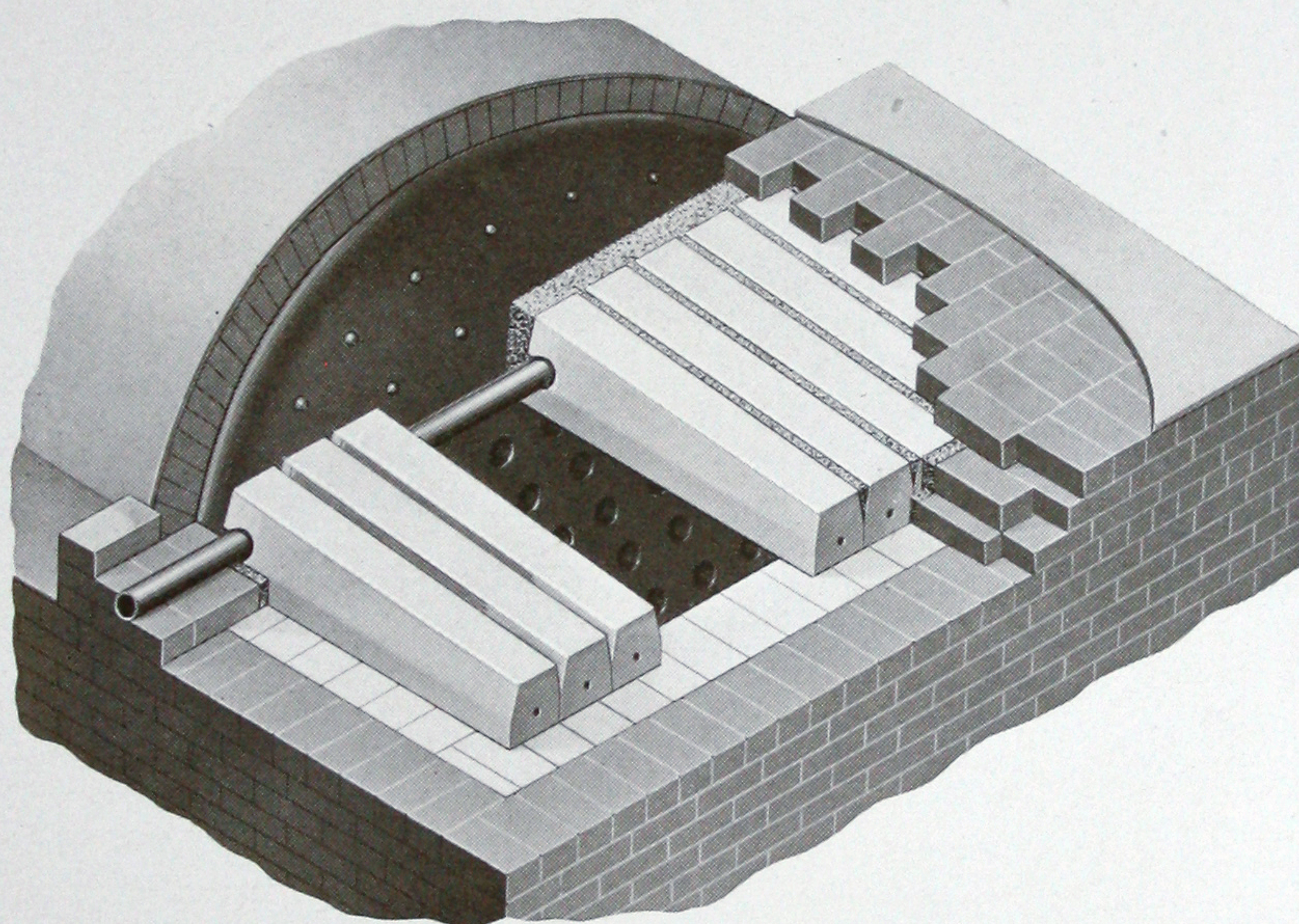


HORIZONTAL RETURN TUBULAR BOILER LINING WITH STRAIGHT GRATE

Interlocking Brick

(Patented)

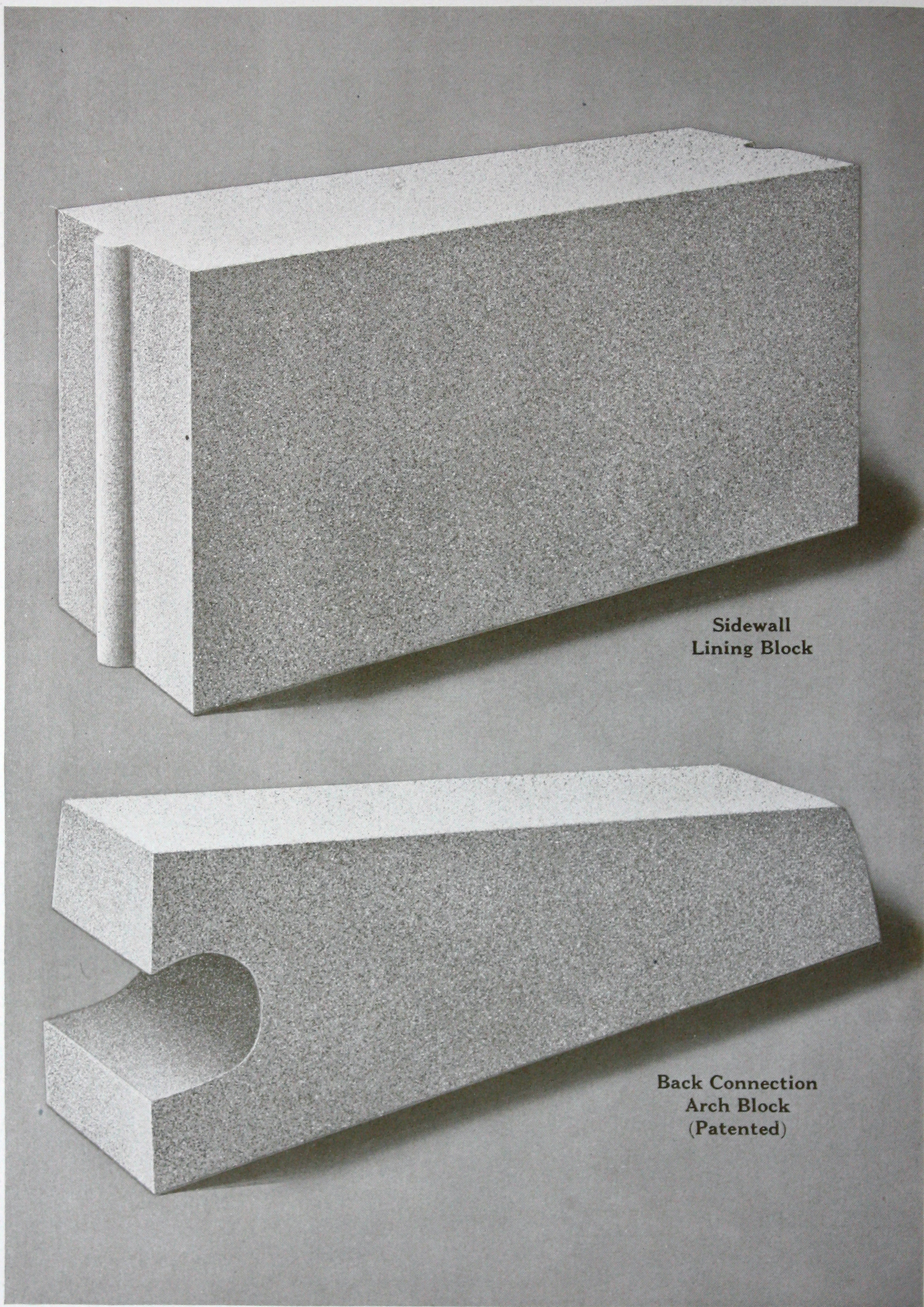
In installations where high narrow sidewalls are necessary we carry in stock brick that interlock on two sides and two ends for use in stretcher courses and on four sides for use in header courses. Installations of these brick when laid dry and then washed with FIRESEAL High Temperature Cement have given service ranging from four to seven years. These brick are manufactured with heavy power represses. They have sharp square edges and true plane surfaces and give best results when laid dry without mortar. Walls lined with these brick in accordance with our instructions are guaranteed against bulging or collapsing regardless of height or length.



BACK CONNECTION ARCH BLOCKS IN POSITION
ON HORIZONTAL RETURN TUBULAR BOILER

(Patented)

The BROOKLYN BACK CONNECTION ARCH is the simplest and most durable arch setting on the market. It is for use with horizontal return tubular boilers only. It consists of a series of blocks with a slot on one end (see page 20) which easily fits over a two-inch pipe that extends across the rear combustion space. The other end of these blocks rests on the rear wall. The joints are V shaped and in them is placed a filling of FIRESEAL high temperature cement. Any block can be removed without disturbing the others. The heat under the arch causes a surprisingly strong and constant passage of air through the pipe and this natural cooling system is so effective that no expensive center supports are required for our hanger. These arches complete with pipe hangers are carried in stock for rear combustion distances ranging from 18" to 36". A larger size for greater distances between boiler and rear wall can be made to order.

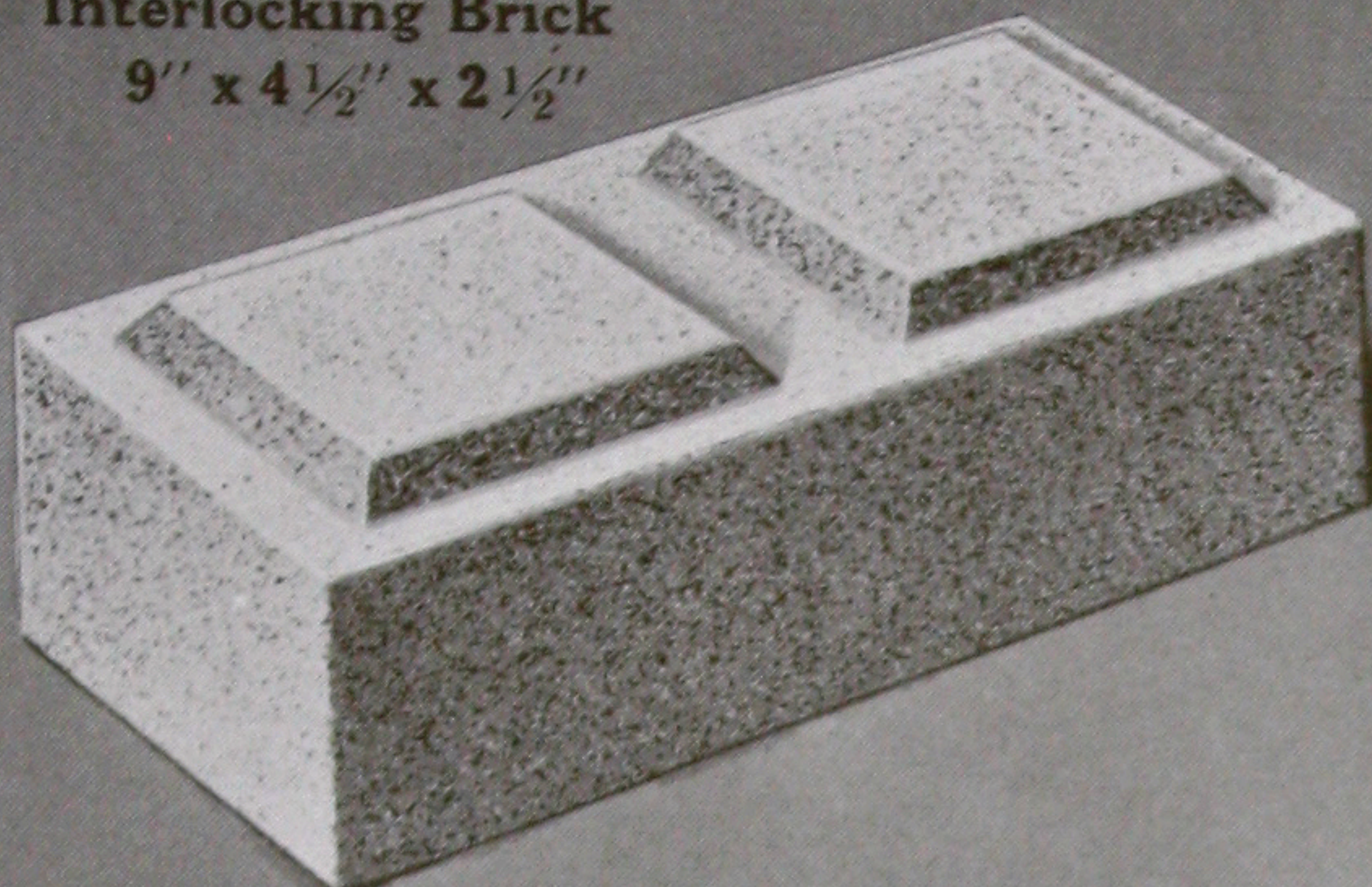


Sidewall
Lining Block

Back Connection
Arch Block
(Patented)

SHAPES FOR BOILER SETTINGS (*See descriptive matter pages 17 and 19*)

Interlocking Brick
9" x 4½" x 2½"

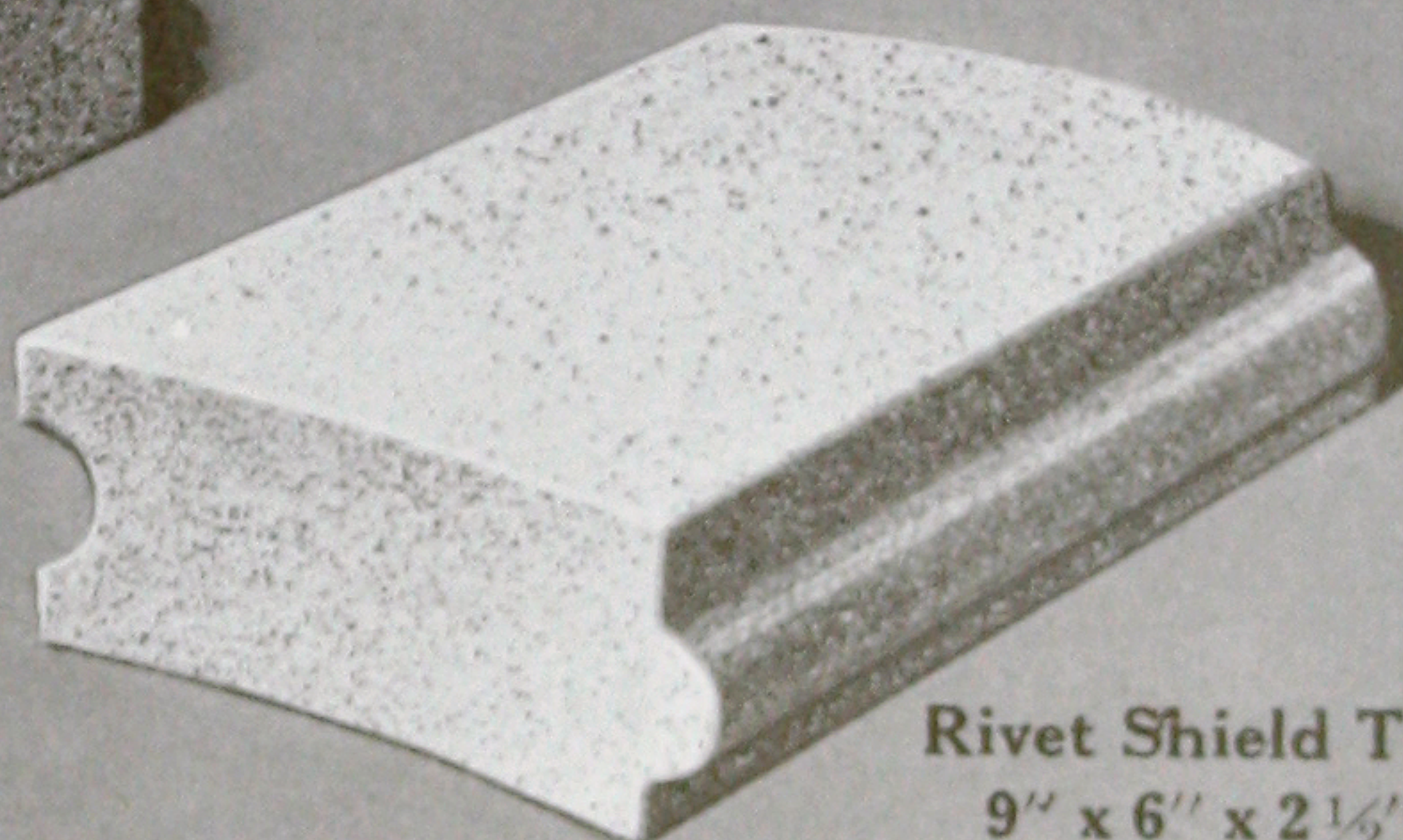


Suitable for Header
and Stretcher Courses

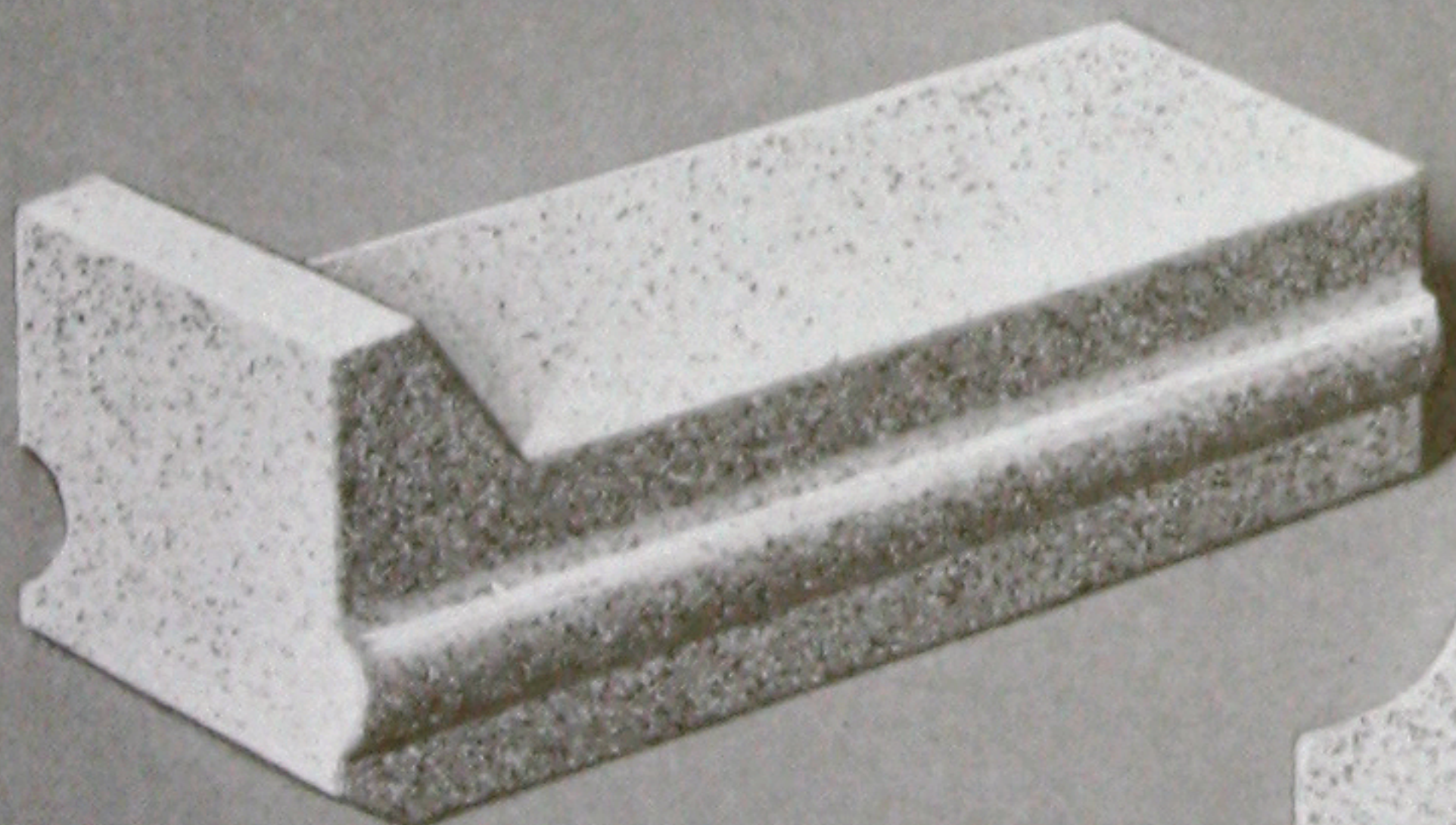


Boiler Baffle Tile
12" x 3¼" x 2¼"

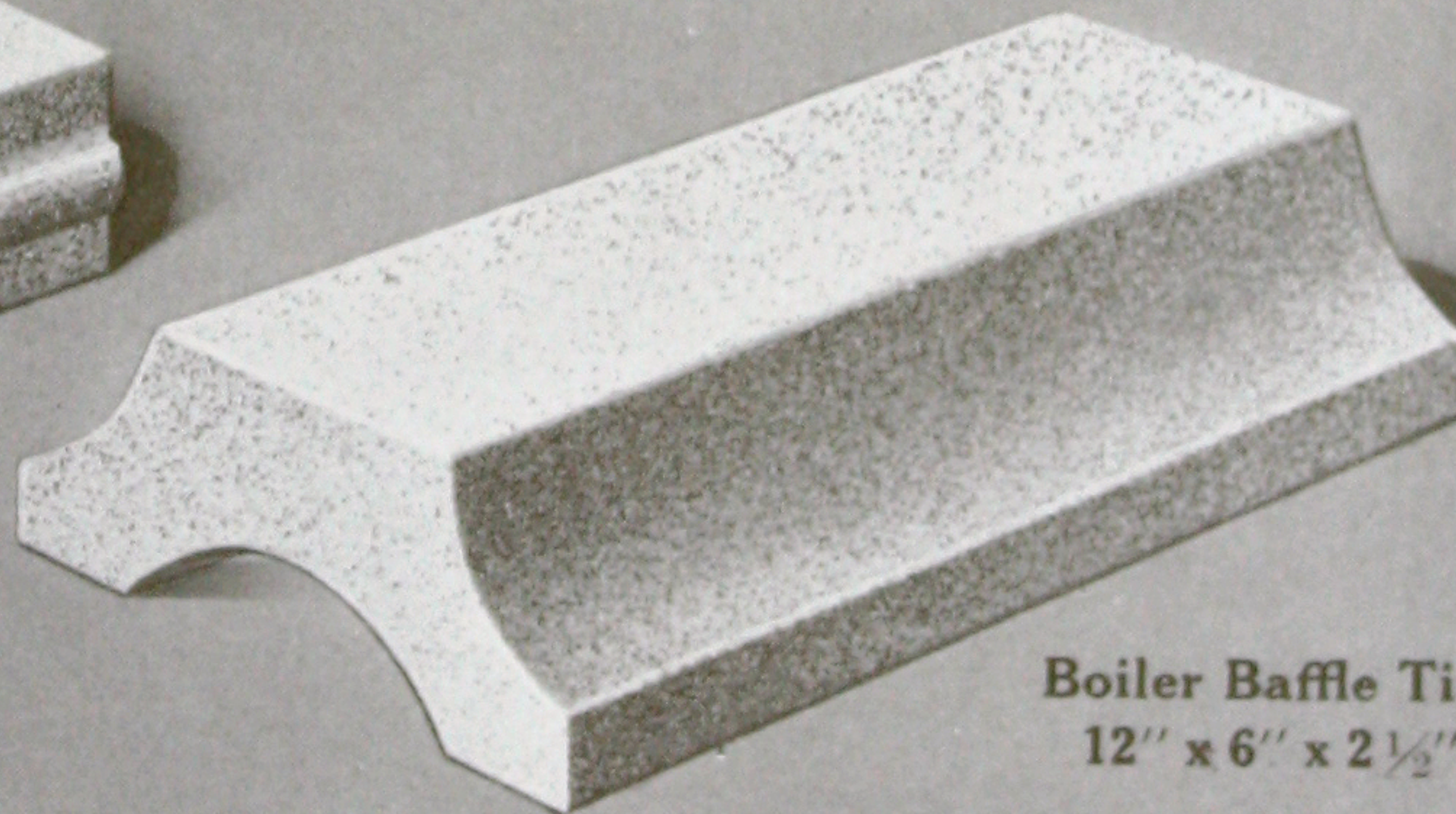
Boiler Baffle Tile
6¾" x 4" x 2"



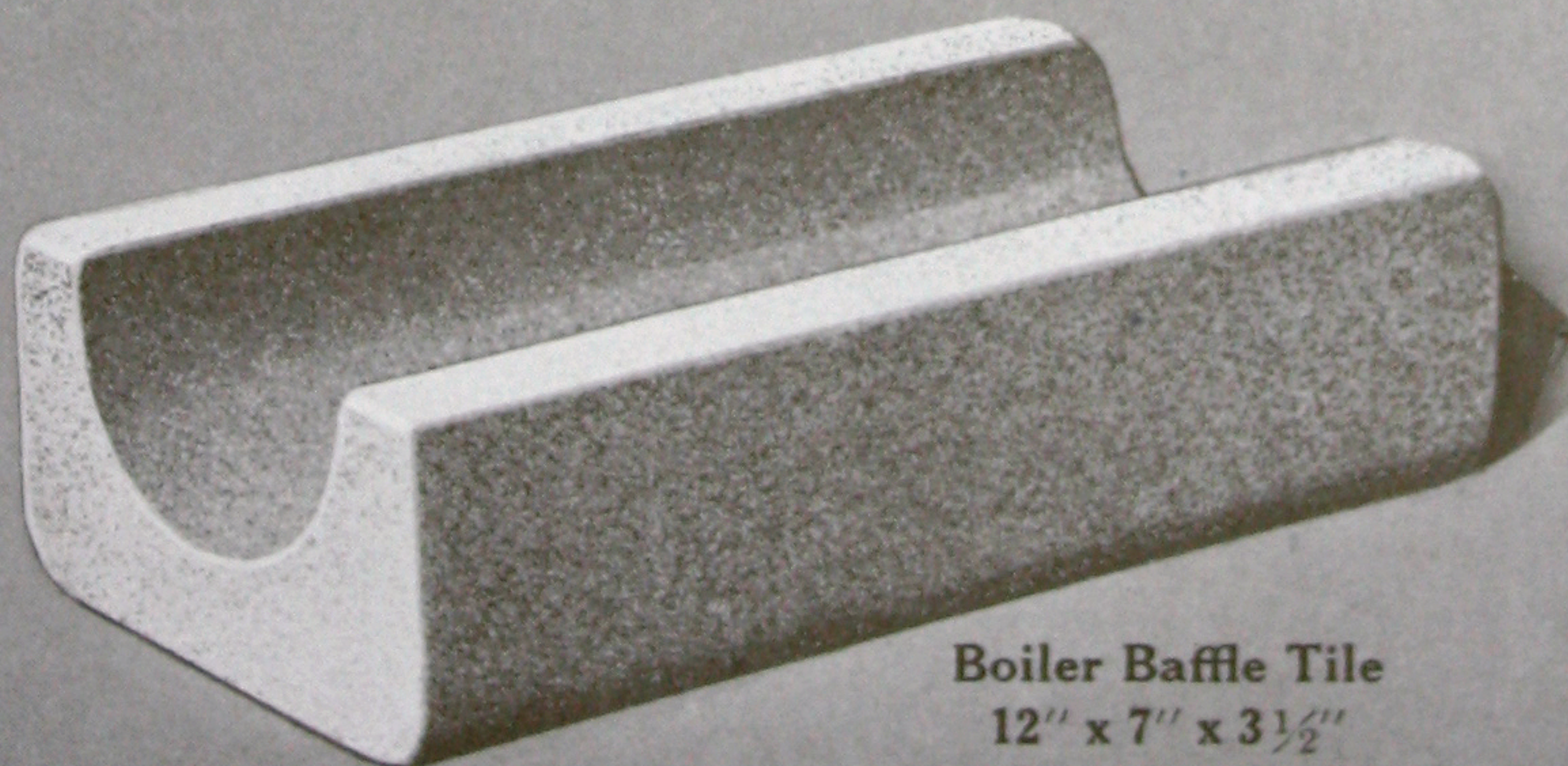
Rivet Shield Tile
9" x 6" x 2½"



Rivet Shield Tile

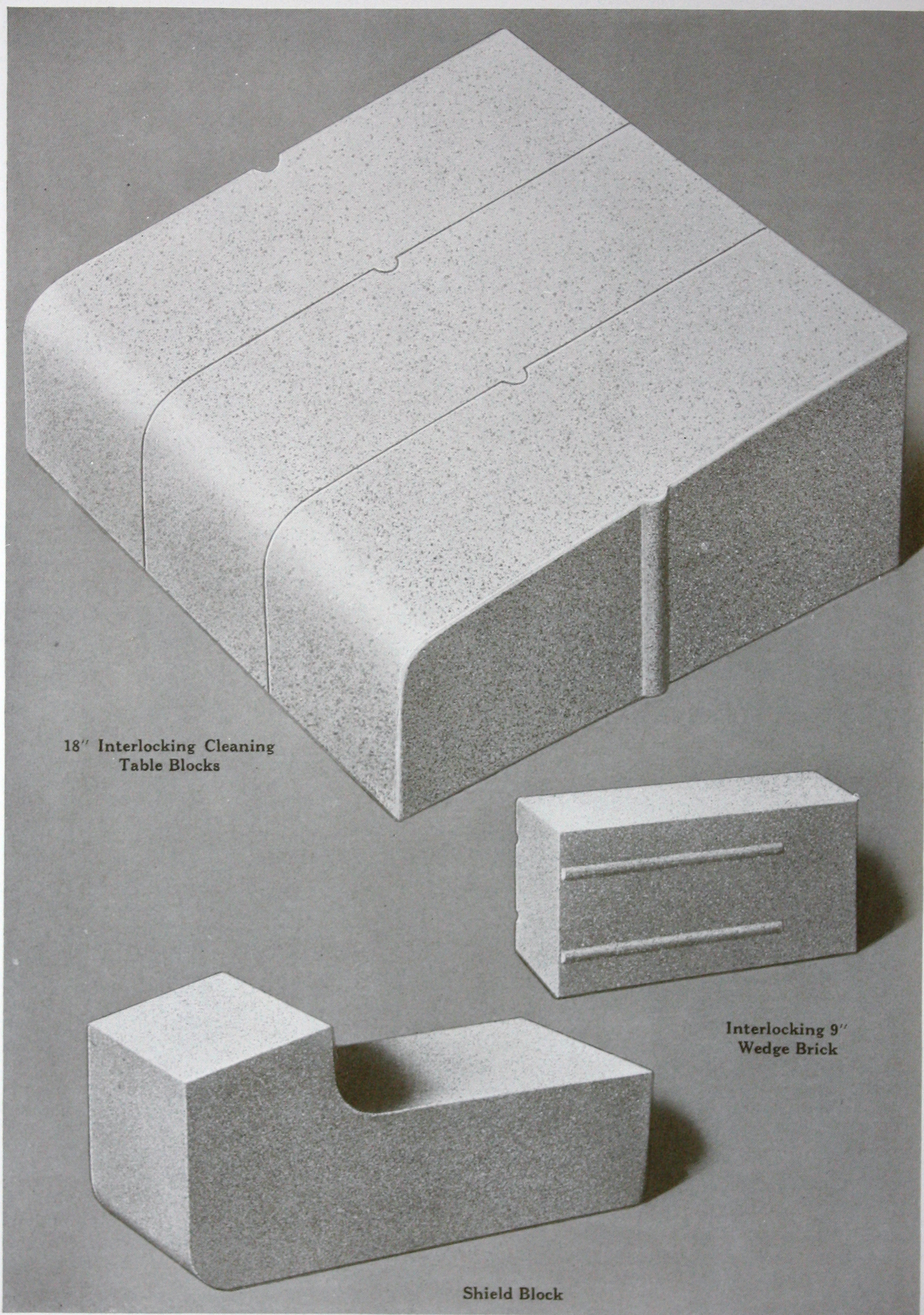


Boiler Baffle Tile
12" x 6" x 2½"



Boiler Baffle Tile
12" x 7" x 3½"

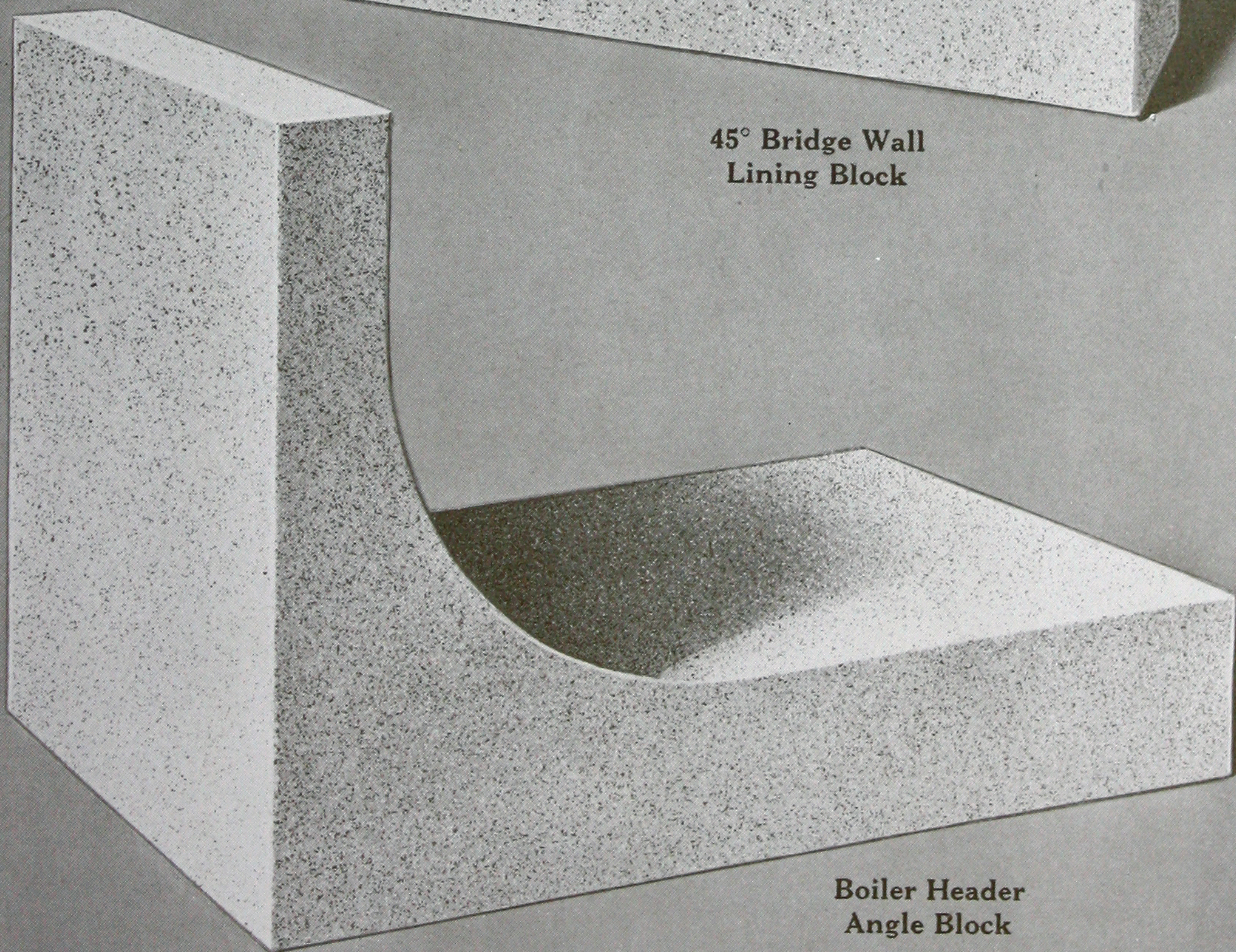
TYPES OF BOILER SETTING TILE



SHAPES FOR SPECIAL BOILER PURPOSES

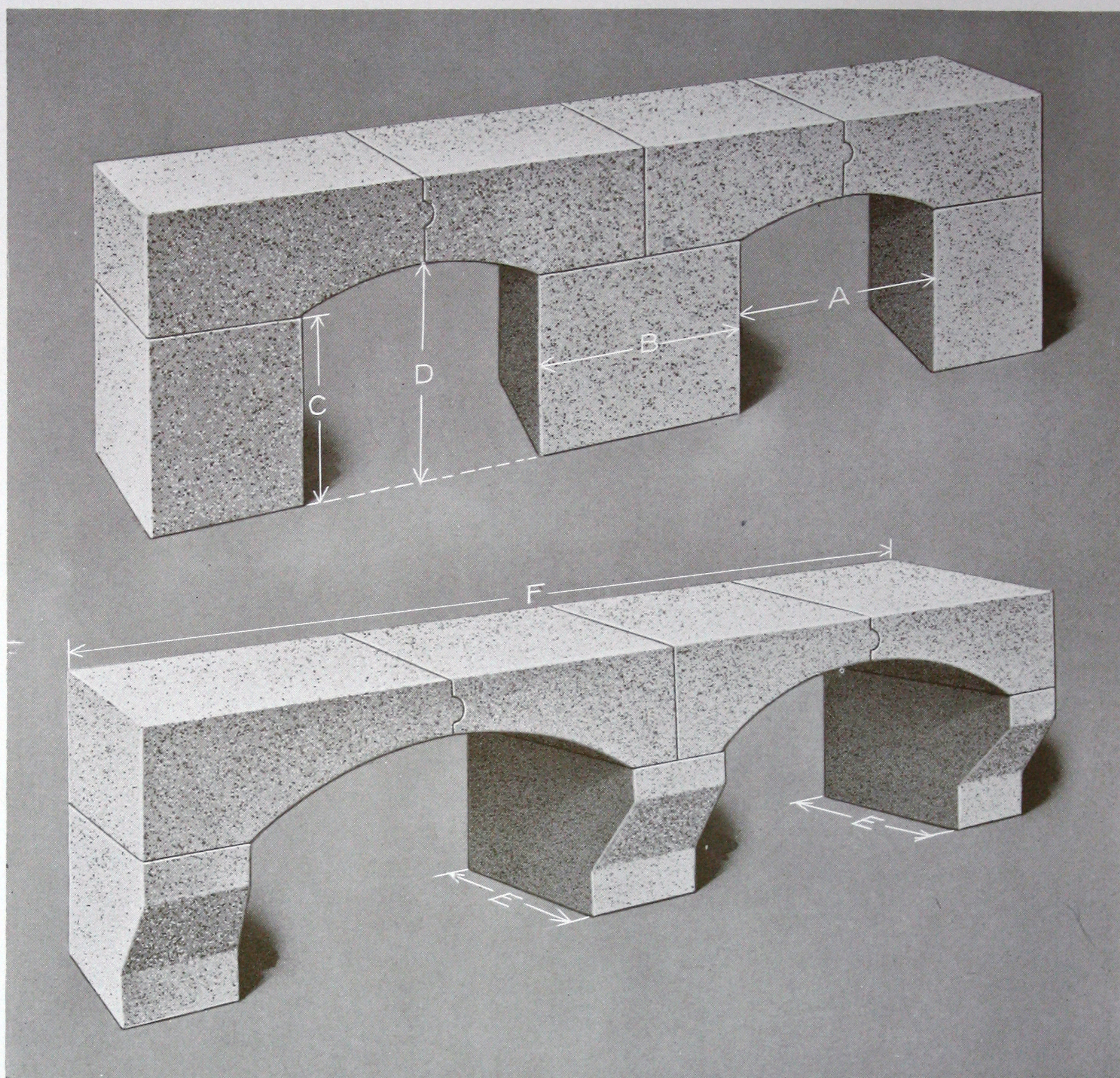


45° Bridge Wall
Lining Block



Boiler Header
Angle Block

SHAPES FOR BOILER SETTINGS (See descriptive matter page 17)



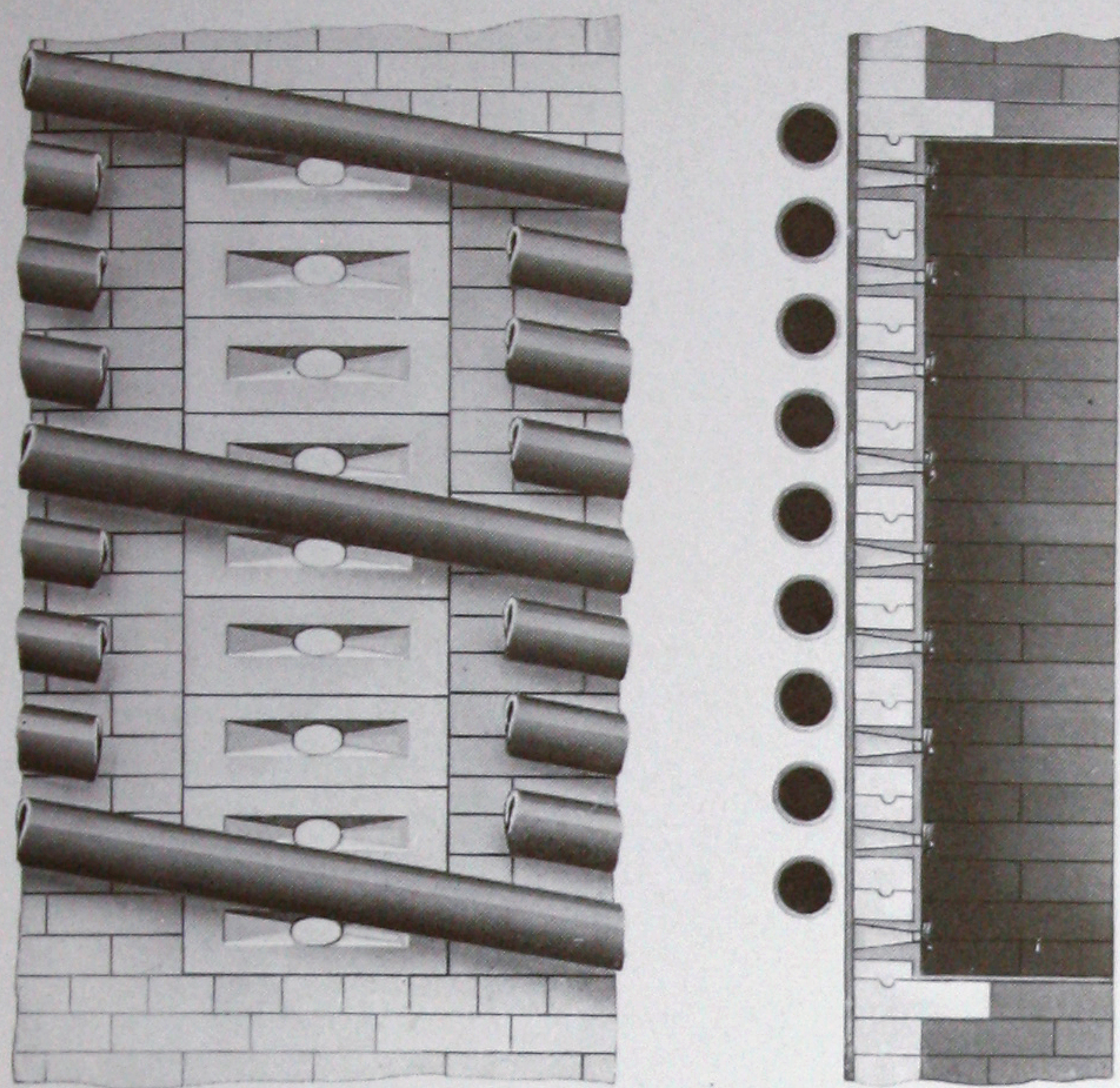
STRAIGHT AND OVERHANGING TYPES OF BOILER DOOR SETTINGS

BROOKLYN BOILER DOOR SETTINGS are illustrated above in two types. One is the regular type with straight front section (upper view looking into fire-box) and the other a new type with projecting top for protecting boiler rivets (lower view from fire-box side).

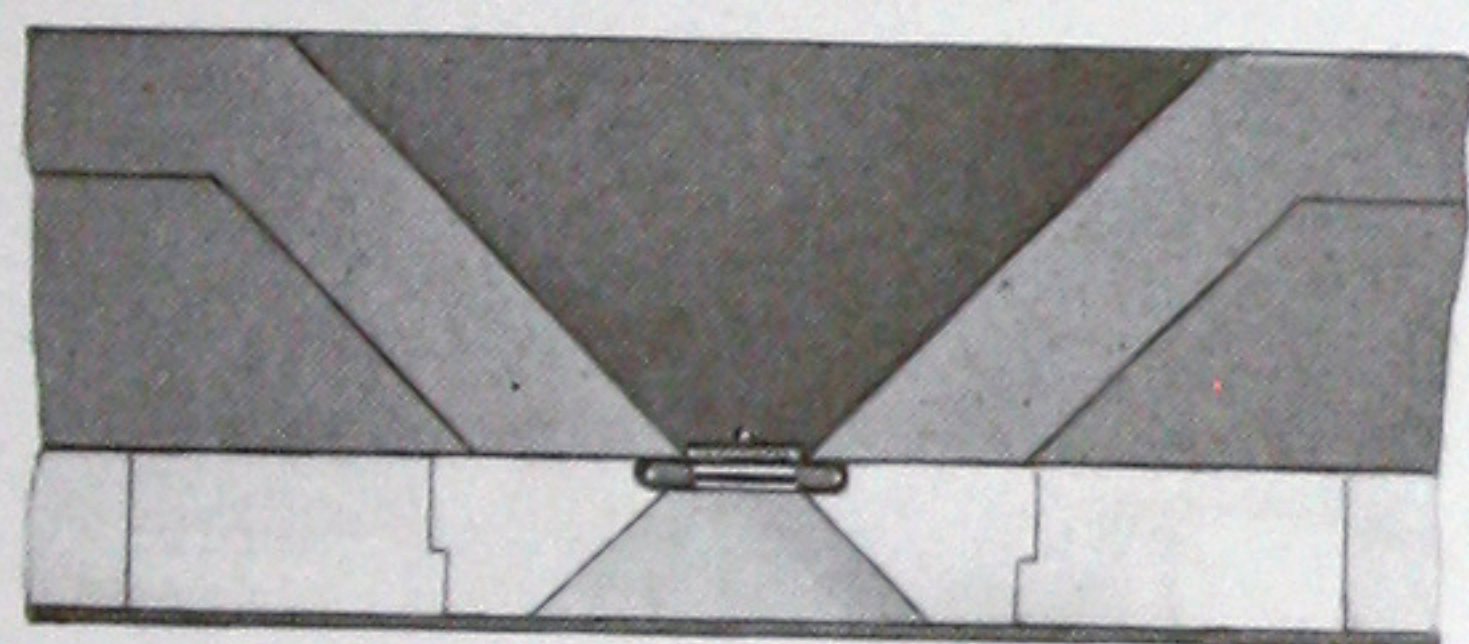
A complete stock to suit all types of boilers is carried in each style. The projecting type has the advantage of affording protection at the top where it is required and allowing plenty of space for hand firing near the grate level.

In ordering these settings, the following data are required:

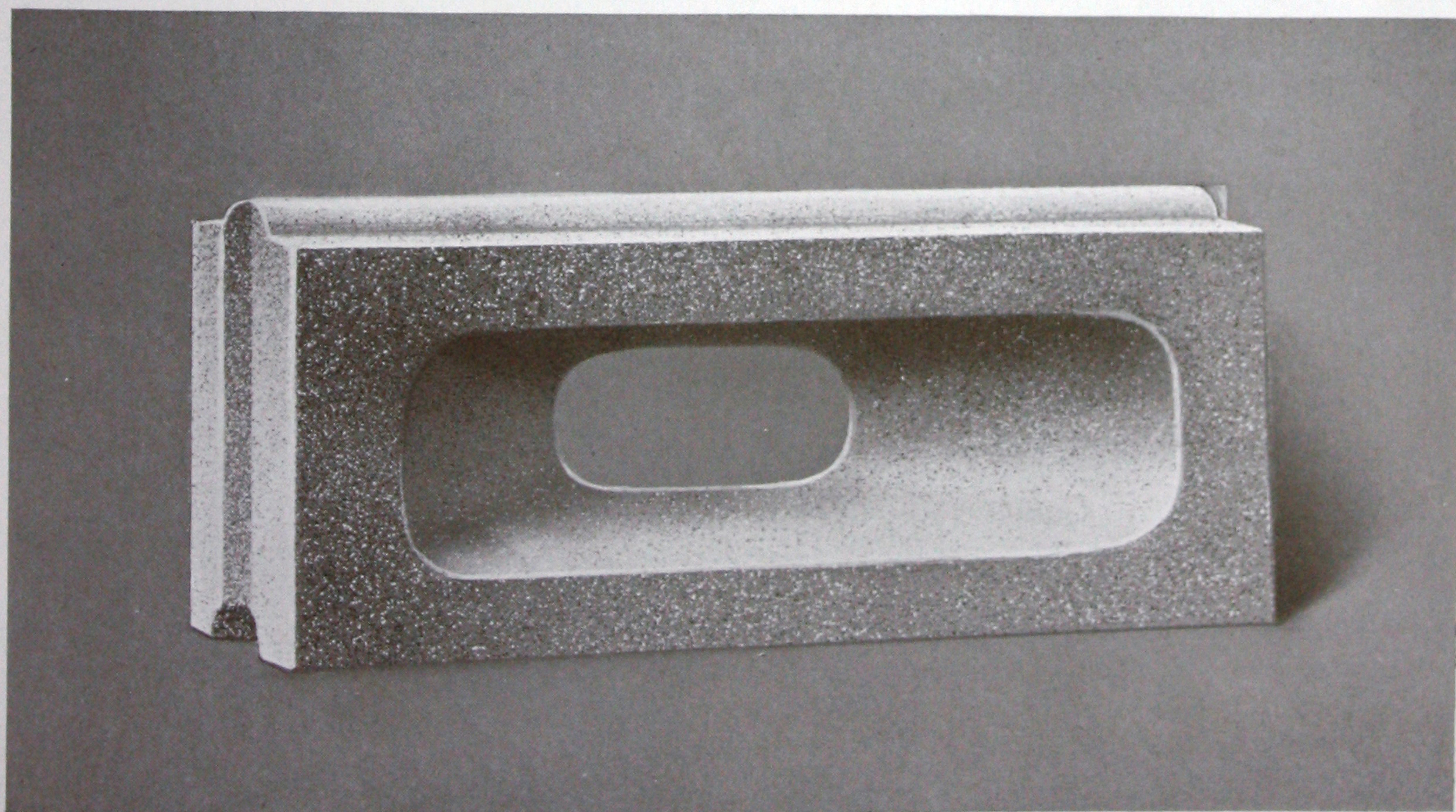
- | | |
|---------------------------------|---|
| Name and Type of Boiler | (D) Height of Door at Center |
| Number of Doors per Boiler | (E) Depth of Dead Plate (Distance from face of boiler to nearest end of grate bars) |
| (A) Width of Door Openings | (F) Overall dimension |
| (B) Space between Door Openings | |
| (C) Height of Door at Side | |



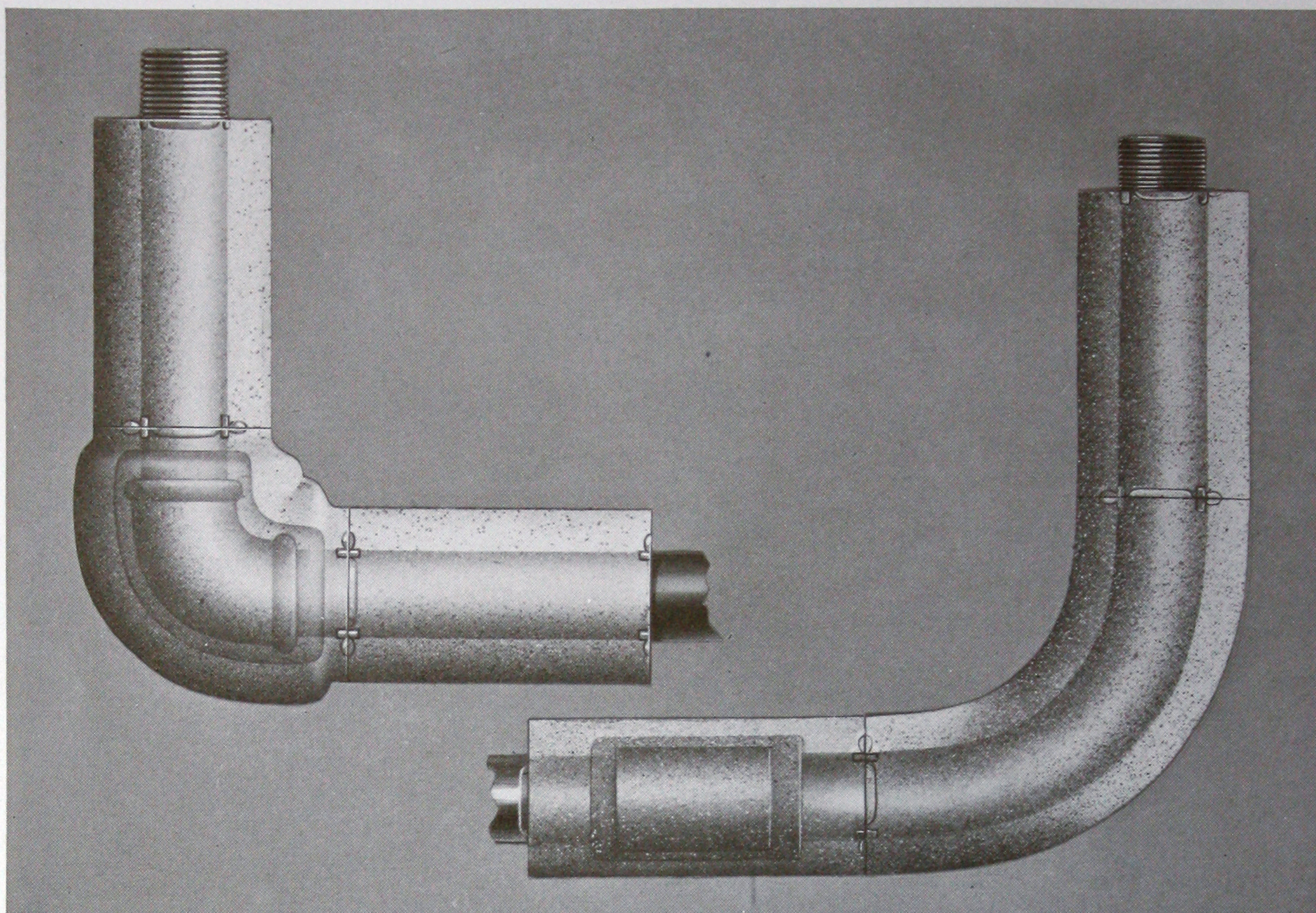
SOOT CLEANING SECTIONS for Water Tube Boilers are special interlocking blocks for use in providing adequate space for conveniently removing soot formation from the tubes, thereby facilitating the flow of the furnace gases. These blocks are flared in all directions to allow ample area of operation of cleaning tools. Because they are built in sections and securely interlocked they add to rather than detract from the strength of the side wall lining.



VIEWS SHOWING SOOT CLEANING DOOR SECTIONS
IN WATER TUBE BOILER



SOOT CLEANING BLOCK FOR WATER TUBE BOILERS



(Patented)

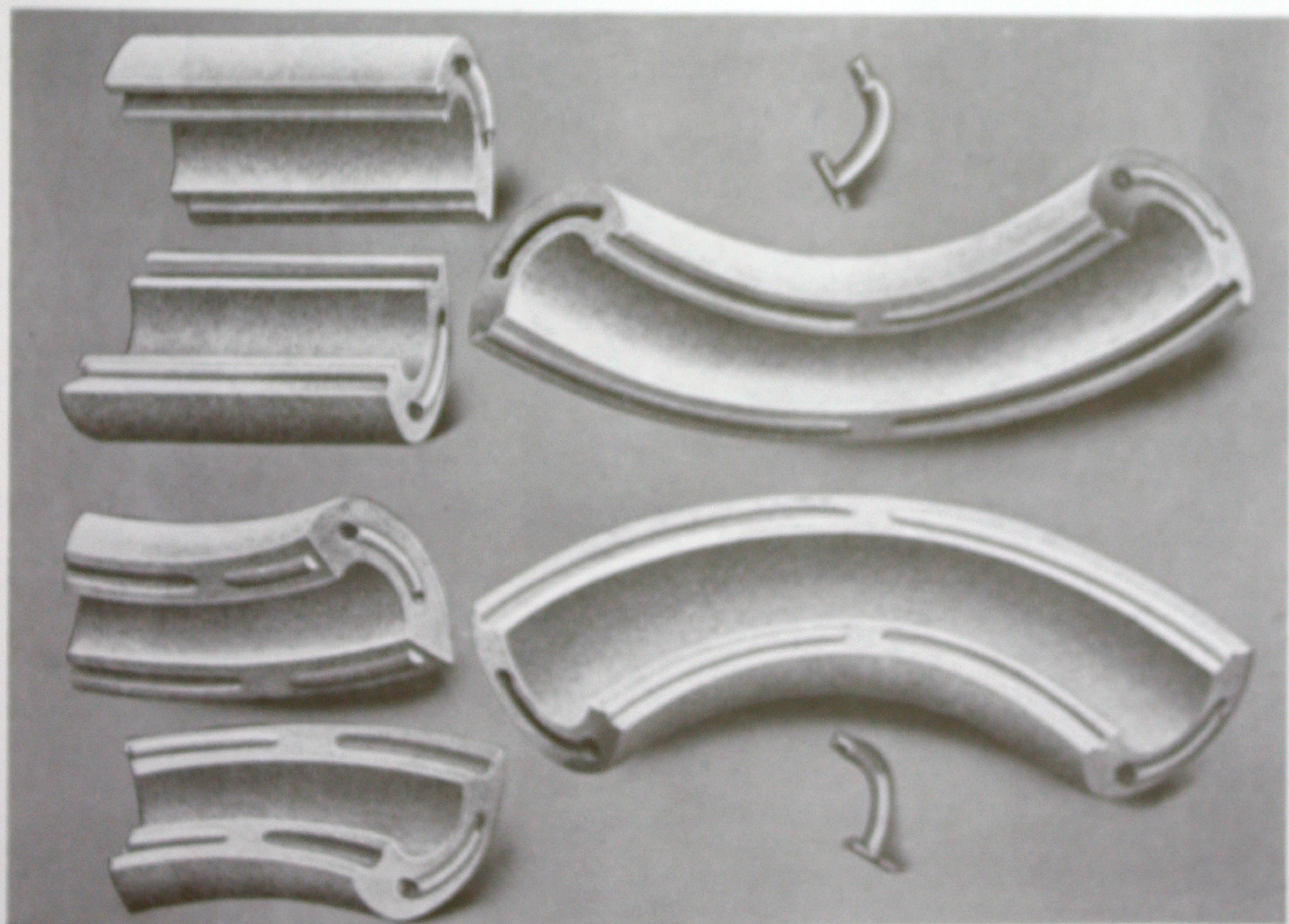
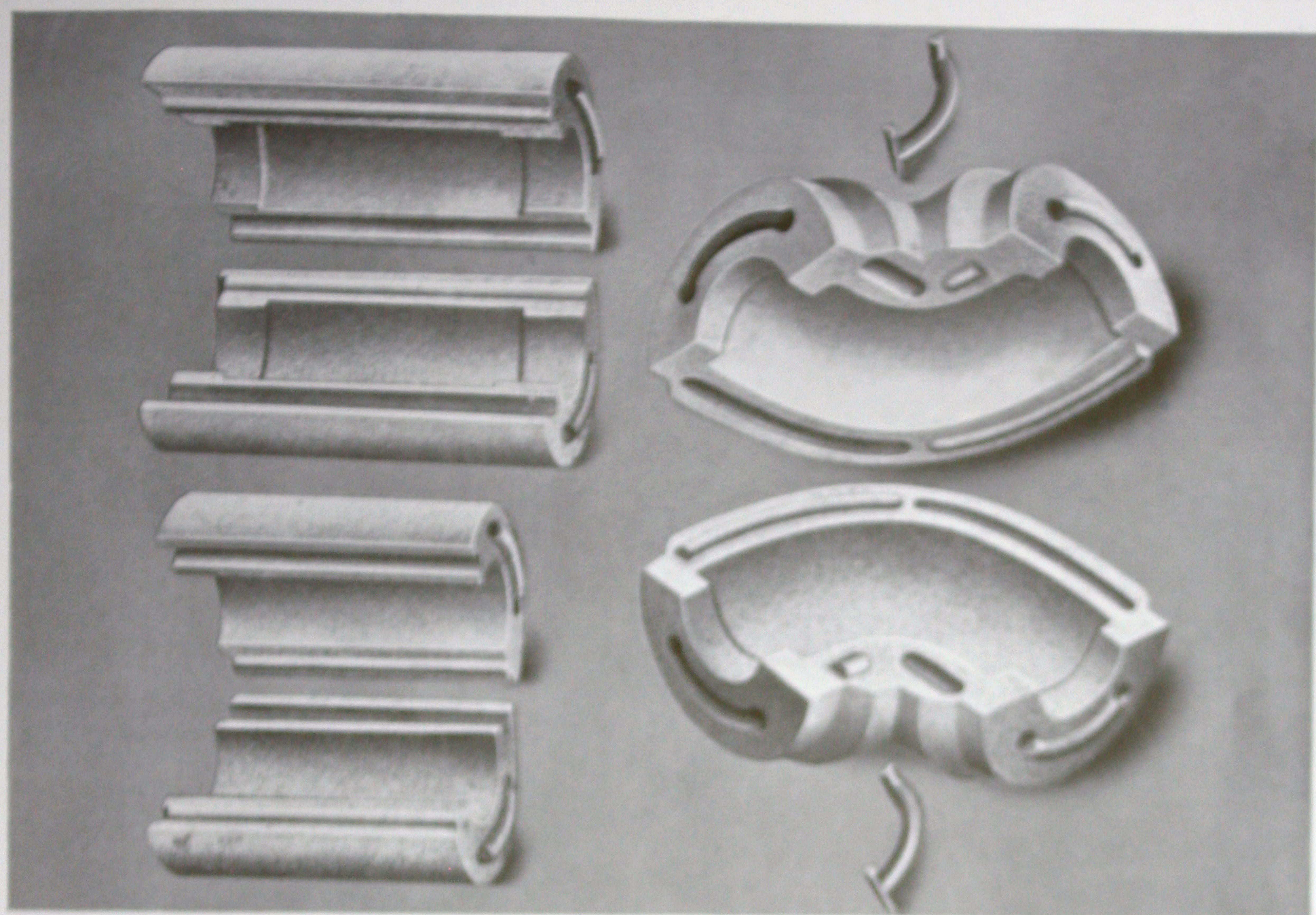
The BROOKLYN BLOW-OFF PIPE PROTECTOR COVERING for Horizontal Return Tubular Boilers is the only covering that will withstand temperatures of 3100 degrees Fahrenheit and that can be fitted to any type of pipe without the erection of supporting piers.

This covering is tongued and grooved both horizontally and vertically. It is gas tight and thoroughly protects the pipe. Sections are made to cover straight pipe, couplings, elbows and bends. All sections are securely held in place by strong iron castings wholly contained within the refractory tile. The phantom views above and views on page 27 show detailed construction.

This system of covering provides complete protection. It does not reduce the efficiency of the boiler as do the heavy and bulky supporting piers that are necessary to hold up most types of coverings. Piers at this point divide the flow of the gases thus depriving the tubes directly over them of their normal flow of heat.

This covering has the additional advantage that it provides ample opportunity to inspect the blow-off pipe. By simply removing the bolted coupling at rear wall entire covering can be disassembled and replaced in a few minutes.

Carried in stock in sizes to cover 2" and 2½" diameter pipes.



HORIZONTAL TUBULAR BOILER BLOW-OFF SECTIONS FOR ELBOW AND BEND CONSTRUCTION

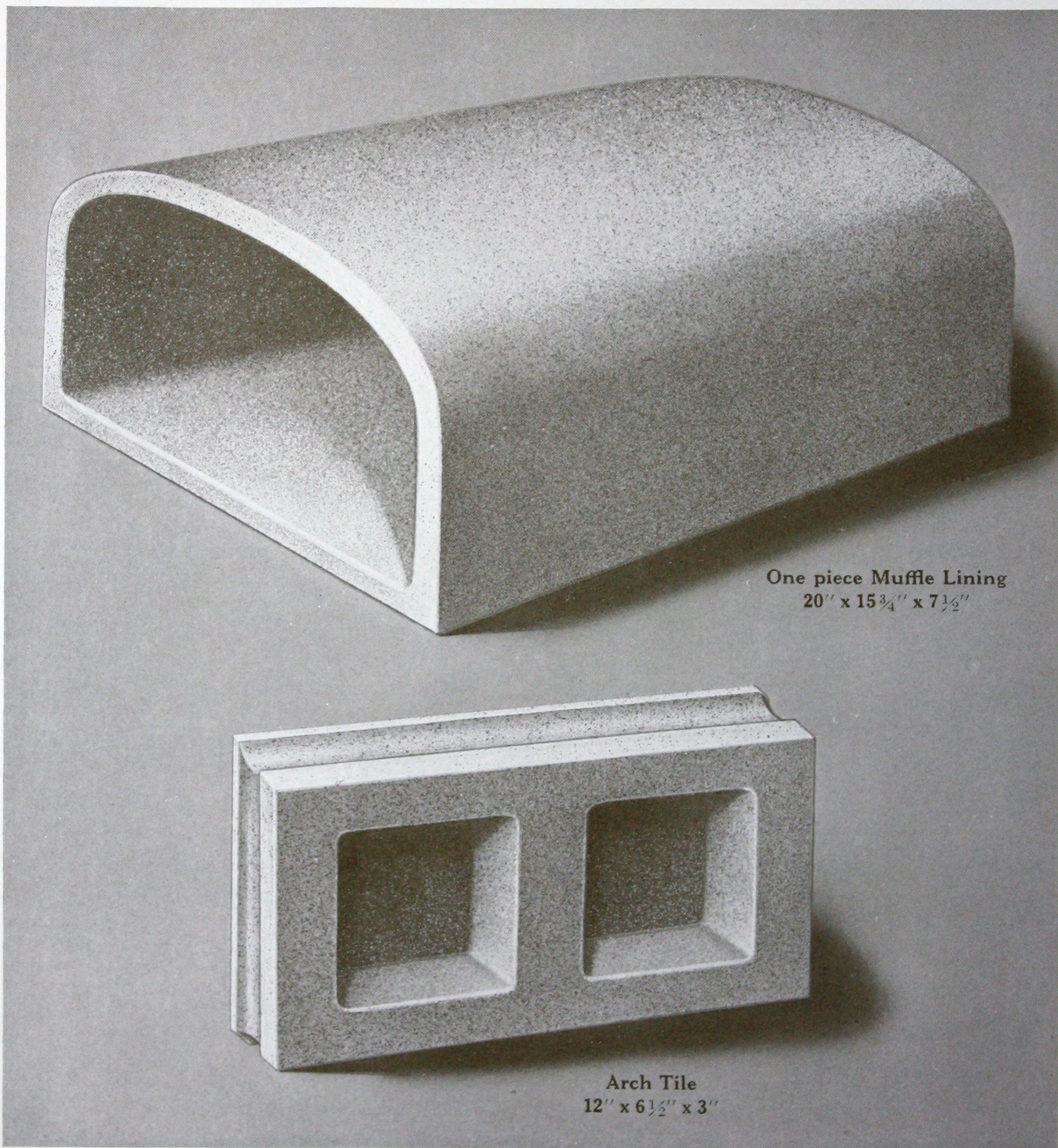
Muffle Furnace Equipment

We specialize in the production of refractory shapes for the enameling and kindred industries.

Our clays are particularly adapted to the production of very thin curved shapes with relatively deep panels which are required in muffle furnace equipment. The load carrying ability of our clays give our tile in such installations a very long life.

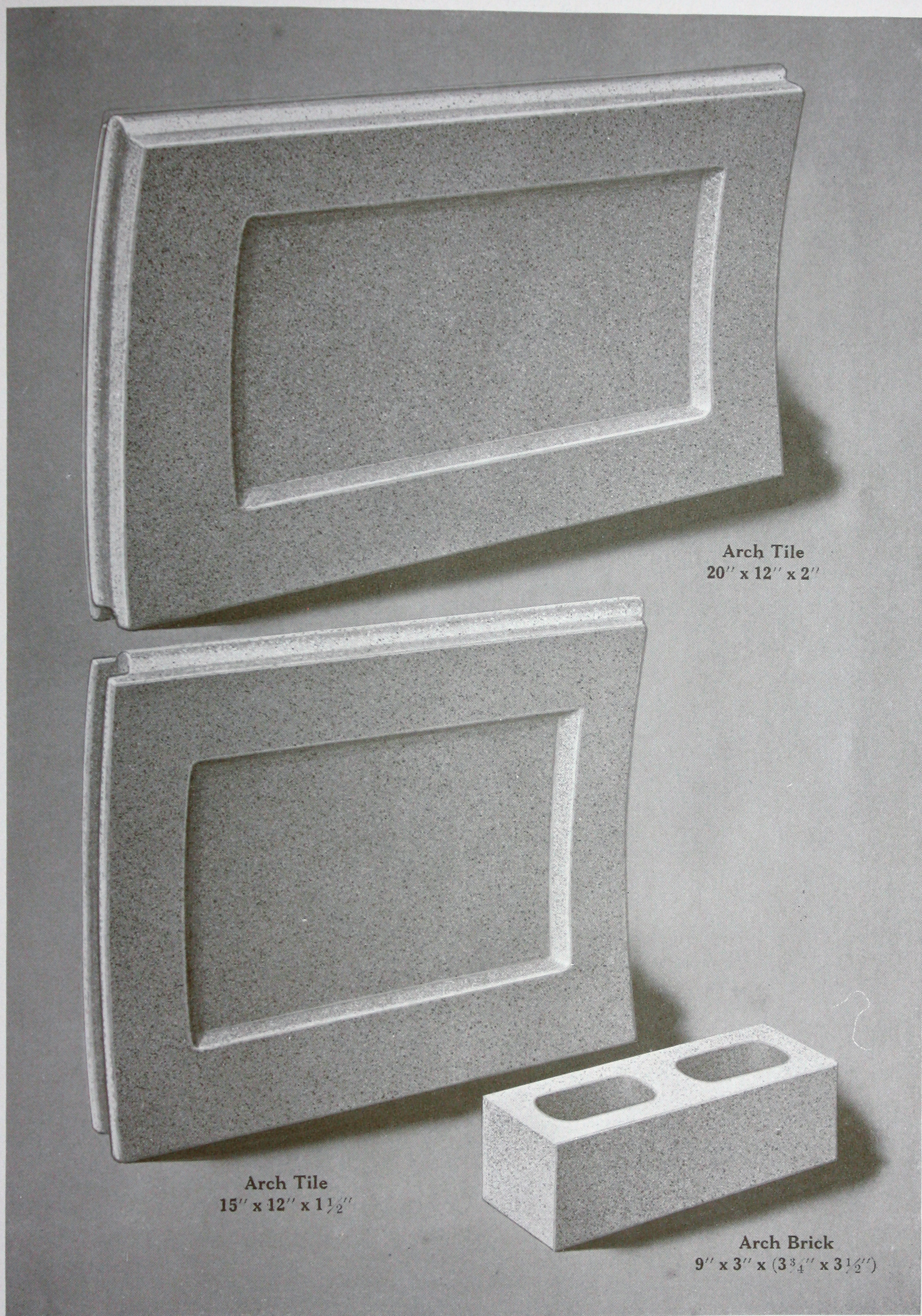
We carry in stock a wide variety of one piece muffle linings for small furnaces. Our sectional muffle linings for large furnaces are made in many different designs. The thicknesses range from one and one half inches to three inches.

Our long experience in this line of production makes our advice on problems of design or construction most dependable.



One piece Muffle Lining
20" x 15 $\frac{3}{4}$ " x 7 $\frac{1}{2}$ "

Arch Tile
12" x 6 $\frac{1}{2}$ " x 3"



Arch Tile
20" x 12" x 2"

Arch Tile
15" x 12" x 1½"

Arch Brick
9" x 3" x (3¾" x 3½")

SHAPES FOR MUFFLE FURNACE EQUIPMENT

Intricate Shapes

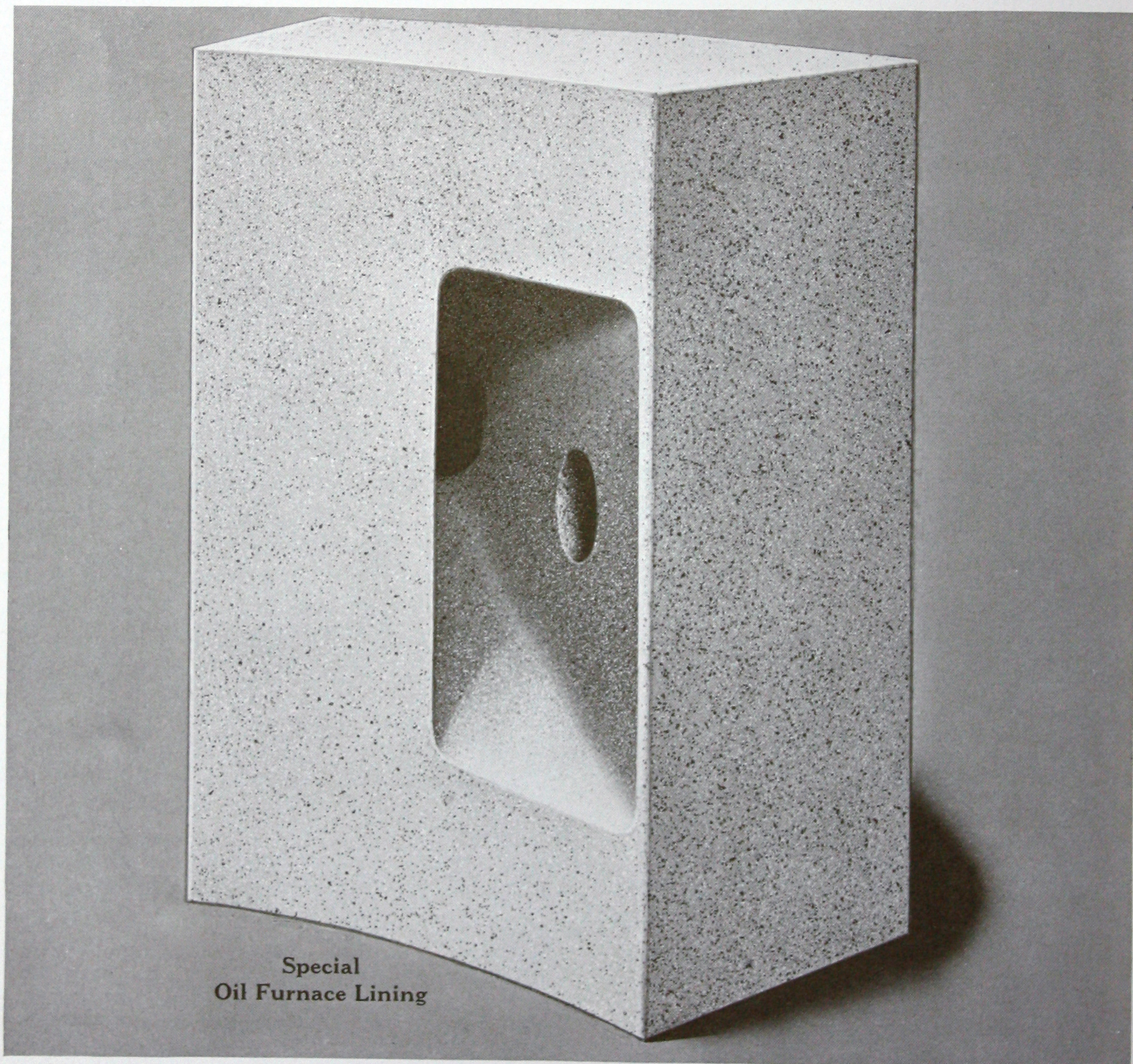
The great diversity of the special shapes we manufacture is shown on the following pages.

The unusually true shapes that can be produced from our clays, coupled with their great load carrying ability has created a wide demand for our products in high temperature equipment requiring special types of refractories.

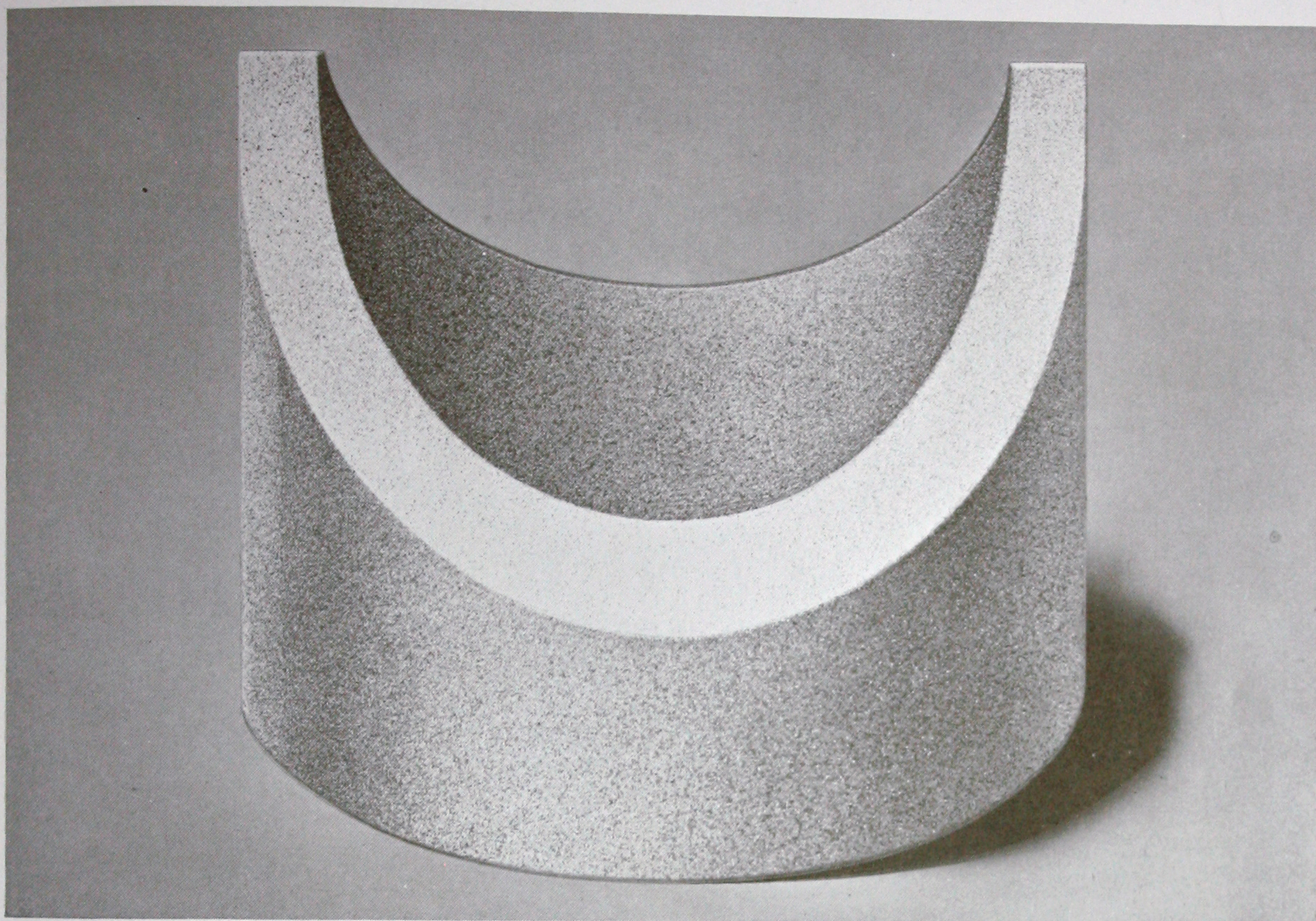
Our material has been found particularly adapted to uses where extremely high temperatures are encountered within extremely small and thoroughly insulated furnaces where pressures on the refractories are developed and radiation of heat is reduced to a minimum.

In view of the well-known fact that disintegration of all brick work usually starts in the joints it is false economy to buy special shapes made from flint clays that are of such coarseness as to make it impossible to produce material with sharp square edges from it. Unless special shapes are true to design and fit properly their durability is greatly reduced.

The accuracy of our special shapes is one of their most noteworthy characteristics.

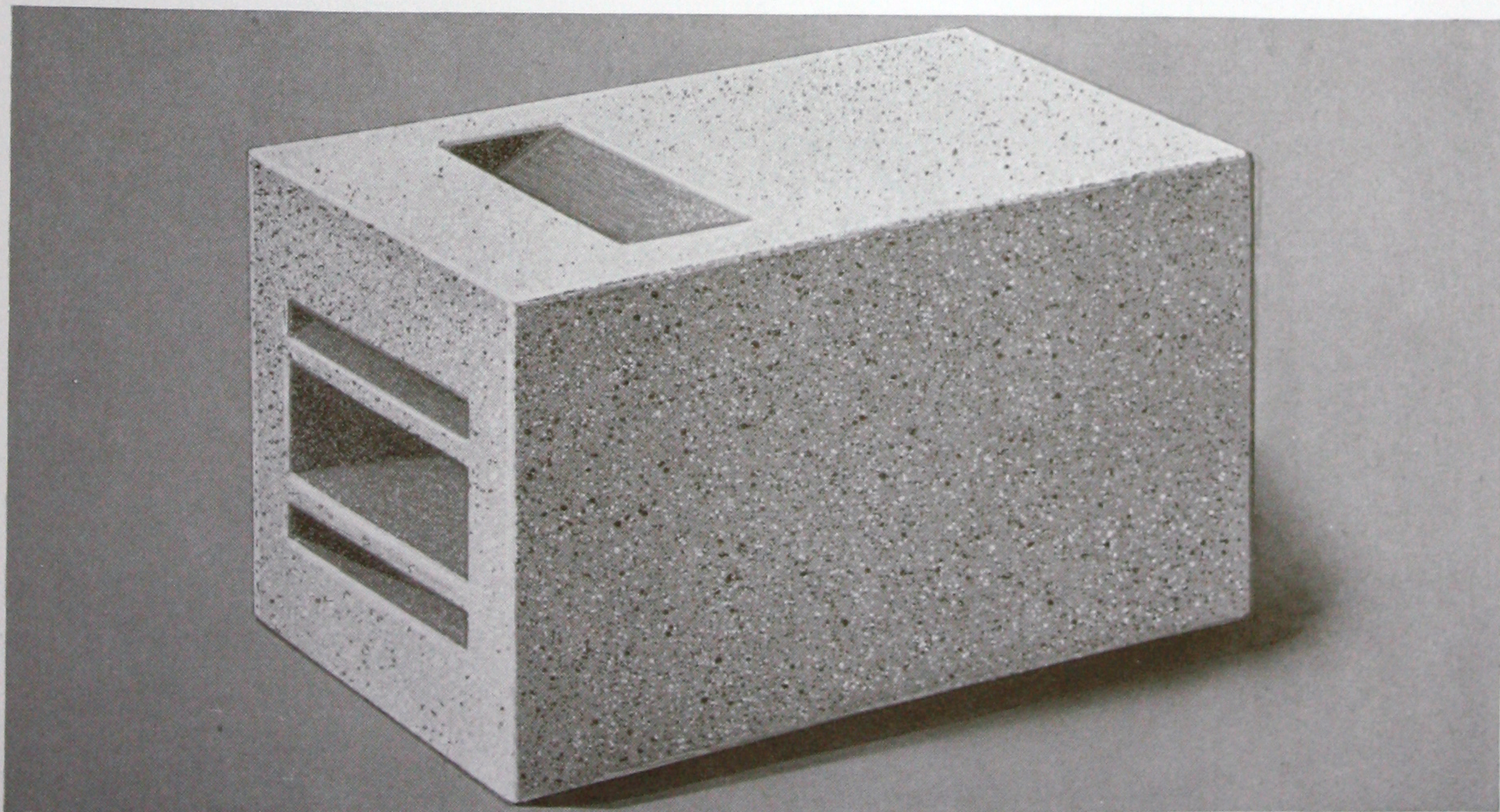


Special
Oil Furnace Lining



SPECIAL SHAPE USED IN GAS PLANT EQUIPMENT

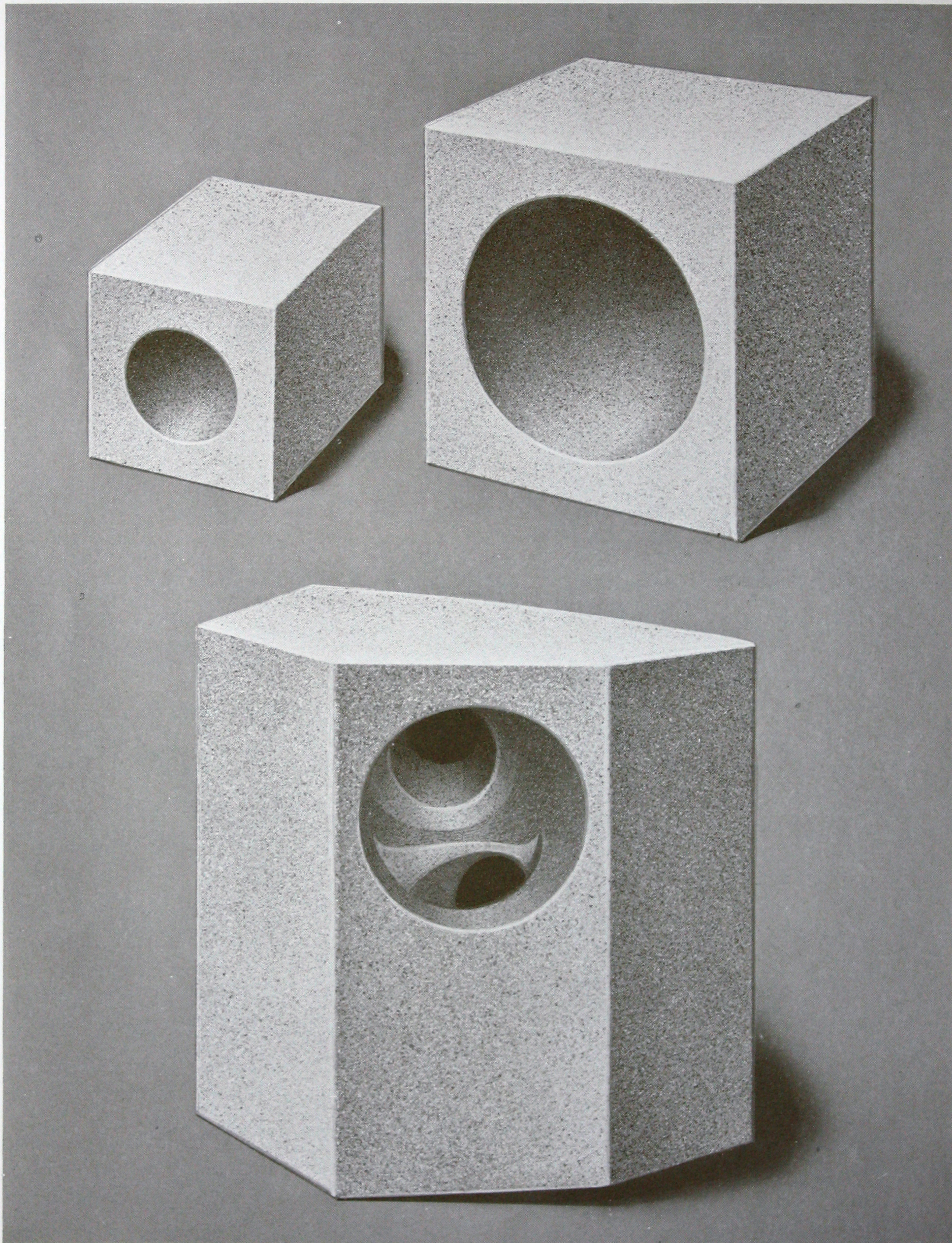
The resistance of our material to the absorption of oil and the close, perfectly fitting joints that are obtained, together with the absence of spalling during the frequent periods of sudden temperature changes make our products rank among the best and most economical for use in water gas plants.



SHAPE FOR ELECTRIC FURNACE EQUIPMENT

Special Furnace Equipment

Unusually difficult shapes, that cannot be made from other clays, can always be produced from BROOKLYN CLAYS. A shape too difficult for us to make is very rare.



FIRESEAL

Reg. U. S. Pat. Off.

HIGH TEMPERATURE FIRE CEMENT

FIRESEAL is a high temperature cement in a dry powder form. Due to its extremely high refractoriness, its neutral chemical action and its strong bonding quality at normal furnace working temperatures FIRESEAL has a wide field of economical uses.

- Its fineness is such that very close even joints—the ideal kind—can be made with it.

Due to its low specific gravity and because it is furnished in fine dry form, an equivalent weight of FIRESEAL will lay twice as many brick as an equal weight of any fire cement that is furnished in plastic form.

It will not fuse from brickwork at temperatures under 3500° F. Neither will it make the brick fuse.

It is remarkably effective in maintaining tight joints where it is subjected to the scouring action of forced drafts.

It can be used to lengthen the life of old brickwork by filling the joints and washing the surface of the lining with it.

In well insulated furnaces operated at high temperatures, where hard service under severe conditions is encountered no cement will be found equal to FIRESEAL.

FIRESEAL Jr.

For uses at intermediate temperatures where it is desirable to have a strong bond developed our “FIRESEAL Jr.,” will be found very effective.

This cement forms a strong bond at lower temperatures than FIRESEAL, but does not have as high a fusion point.

It is also very effective and gives much protection to brickwork when applied as a wash on the surface exposed to the fire.

When mixed with broken brick it can be used to make repairs to damaged brickwork, thus enabling the operator to get the full term of use from his linings.

“FIRESEAL Jr.,” is furnished in dry form in bags and has only to be mixed with water to be ready for use.

Our technical department is constantly investigating the possibilities and present uses of fire cements and its experience is always available for the advice of our customers.

Useful Information

BROOKLYN FIRE BRICK should be laid with BROOKLYN FIRESEAL Cement or BROOKLYN Fire Clay. Don't use low-grade fire clays for mortar. They fuse at low temperatures, allow the flames to get in the joints and greatly reduce the life of the lining.

If high temperature cement is used, it too should have as its base the same clay from which the brick are made. You get this in our BROOKLYN FIRESEAL High Temperature Fire Cement.

In laying fire brick the thinnest joint possible should be used. The mortar should be a thin paste and souplike so it will pour from a dipper. Dip the bonding surface of the brick and rub or hammer them together. Close, tight joints will prove real economy and lengthen the life of the brick.

Do not add any foreign materials to dry milled fire clay used for mortar. Under no circumstances should any mixture of Portland cement, lime, asbestos, waterglass or salt be used in the mortar. Neither should any patented or so-called high-temperature cements which contain any of these be used.

After your fire brick work is done the furnace should be slowly heated to expel all the moisture. Don't put the furnace on high fire until the brick work is entirely dry.

When ordering fire brick don't forget to order BROOKLYN FIRESEAL Cement also.

When ordering fire brick for boiler work, the following information should be furnished: Name or type of boiler; what kind of fuel used; how the furnace is fired; if by stoker, name of stoker; forced or natural draft; overload, if any; rise and span of arch. We can then better tell which brick will be best for your work.

For estimating on fire brick work use the following figures:

1 square foot, 4½ inch wall requires.....	7 brick
1 square foot, 9 inch wall requires.....	14 brick
1 square foot, 13½ inch wall requires.....	21 brick
1 cubic foot..... wall requires.....	17 9" brick
1 cubic yard..... wall requires.....	460 9" brick

One cubic foot of BROOKLYN Fire Clay brickwork weighs approximately 125 pounds.

A nine inch straight fire brick (9" x 4½" x 2½") weighs approximately six and one half pounds.

1,000 fire brick, closely packed, occupy 58 cubic feet.

1,000 fire brick, loosely packed, occupy 74 cubic feet.

Where key, wedge and other shapes are used, add 10 per cent in estimating the required number.

For estimating on red brick work, figure on nine cubic feet of sand and three bushels of lime for laying 1,000 brick.

Approximately 10,000 fire brick will make a minimum car load 60,000 pounds capacity car.

The minimum carload for fire brick or clays is 60,000 pounds.

All fire brick when stored should be protected from the weather. This particularly applies during the winter season, as moisture, especially in cold weather, will greatly injure any brick.

Remember that many "special fire clay shapes" are so generally used that they are carried in stock for prompt shipment. Particularly is this true of tube and baffle tile, stoker and arch blocks, square edge tile, etc.

In ordering special shapes always send a blue print if possible. The next best thing is to send a rough drawing showing all sizes and radii. This saves time and avoids getting tile which do not fit.

Anticipate your requirements as far as possible. This is especially true with special fire clay shapes. Six to eight weeks is necessary, usually, to manufacture, dry and burn "made-to-order" material.

All new brick should be heated very gradually to expel moisture before being subjected to very intense heat.

Decimals of an Inch for Each 1-64th

$\frac{1}{64}$ -.015625	$\frac{11}{32}$ -.34375	$\frac{43}{64}$ -.671875
$\frac{1}{32}$ -.03125	$\frac{23}{64}$ -.359375	$\frac{11}{16}$ -.6875
$\frac{3}{64}$ -.046875	$\frac{3}{8}$ -.375	$\frac{45}{64}$ -.703125
$\frac{1}{16}$ -.0625	$\frac{25}{64}$ -.390625	$\frac{23}{32}$ -.71875
$\frac{5}{64}$ -.078125	$\frac{13}{32}$ -.40625	$\frac{47}{64}$ -.734375
$\frac{3}{32}$ -.09375	$\frac{27}{64}$ -.421875	$\frac{3}{4}$ -.75
$\frac{7}{64}$ -.109375	$\frac{7}{16}$ -.4375	$\frac{49}{64}$ -.765625
$\frac{1}{8}$ -.125	$\frac{29}{64}$ -.453125	$\frac{25}{32}$ -.78125
$\frac{9}{64}$ -.140625	$\frac{15}{32}$ -.46875	$\frac{51}{64}$ -.796875
$\frac{5}{32}$ -.15625	$\frac{31}{64}$ -.484375	$\frac{13}{16}$ -.8125
$\frac{11}{64}$ -.171875	$\frac{1}{2}$ -.500	$\frac{53}{64}$ -.828125
$\frac{3}{16}$ -.1875	$\frac{33}{64}$ -.515625	$\frac{27}{32}$ -.84375
$\frac{13}{64}$ -.203125	$\frac{17}{32}$ -.53125	$\frac{55}{64}$ -.859375
$\frac{7}{32}$ -.21875	$\frac{35}{64}$ -.546875	$\frac{7}{8}$ -.875
$\frac{15}{64}$ -.234375	$\frac{9}{16}$ -.5625	$\frac{57}{64}$ -.890625
$\frac{1}{4}$ -.250	$\frac{37}{64}$ -.578125	$\frac{29}{32}$ -.90625
$\frac{17}{64}$ -.265625	$\frac{19}{32}$ -.59375	$\frac{59}{64}$ -.921875
$\frac{9}{32}$ -.28125	$\frac{39}{64}$ -.609375	$\frac{15}{16}$ -.9375
$\frac{19}{64}$ -.296875	$\frac{5}{8}$ -.625	$\frac{61}{64}$ -.953125
$\frac{5}{16}$ -.3125	$\frac{41}{64}$ -.640625	$\frac{31}{32}$ -.96875
$\frac{21}{64}$ -.328125	$\frac{21}{32}$ -.65625	$\frac{63}{64}$ -.984375
		1—1.

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Compiled by Donald M. Liddell, C. E.

Color Scales¹

WHITE AND TAYLOR			POUILLET			HOWE		
Name of color	Deg. C.	Deg. F.	Name of color	Deg. C.	Deg. F.	Name of color	Deg. C.	Deg. F.
Dark red	566	1050	Incipient redness	525	977	Lowest visible red in dark	470	878
Dark cherry red	635	1175	Dark red	700	1292	Lowest visible red in daylight	475	887
Cherry, full red	746	1375	Incipient cherry red	800	1472	Dull red	550-625	1022-1157
Light cherry, bright			Cherry red	900	1652	Full cherry	700	1292
cherry, light red	843	1549	Light cherry red	1000	1832	Light red	850	1562
Orange	899	1650	Dark orange	1100	2012			
Light orange	941	1726	Light orange	1200	2192			
Yellow	996	1825						
White	1205	2201	White	1300	2372	Full yellow	950-1000	1742-1832
			Brilliant white	1400	2552	White	1150	2102
			Dazzling white	1500-1600				
					2732-2912			

¹ Hofman, "General Metallurgy," p. 138.

Fusing Points of Seger Cones

Number of Cone	Fusing Point		Number of Cone	Fusing Point		Number of Cone	Fusing Point		Number of Cone	Fusing Point	
	Degrees Fahr.	Degrees Centig.		Degrees Fahr.	Degrees Centig.		Degrees Fahr.	Degrees Centig.		Degrees Fahr.	Degrees Centig.
.022	1,094	590	.06	1,886	1,030	10	2,426	1,330	25	2,966	1,630
.021	1,148	620	.05	1,922	1,050	11	2,462	1,350	26	3,002	1,650
.020	1,202	650	.04	1,958	1,070	12	2,498	1,370	27	3,038	1,670
.019	1,256	680	.03	1,994	1,090	13	2,534	1,390	28	3,074	1,690
.018	1,310	710	.02	2,030	1,110	14	2,570	1,410	29	3,110	1,710
.017	1,364	740	.01	2,066	1,130	15	2,606	1,430	30	3,146	1,730
.016	1,418	770	1	2,102	1,150	16	2,642	1,450	31	3,182	1,750
.015	1,472	800	2	2,138	1,170	17	2,678	1,470	32	3,218	1,770
.014	1,526	830	3	2,174	1,190	18	2,714	1,490	33	3,254	1,790
.013	1,580	860	4	2,210	1,210	19	2,750	1,510	34	3,290	1,810
.012	1,634	890	5	2,246	1,230	20	2,786	1,530	35	3,326	1,830
.011	1,688	920	6	2,282	1,250	21	2,822	1,550	36	3,362	1,850
.010	1,742	950	7	2,318	1,270	22	2,858	1,570	37	3,398	1,870
.09	1,778	970	8	2,354	1,290	23	2,894	1,590	38	3,434	1,890
.08	1,814	990	9	2,390	1,310	24	2,930	1,610	39	3,470	1,910
.07	1,850	1,010							40	3,506	1,930

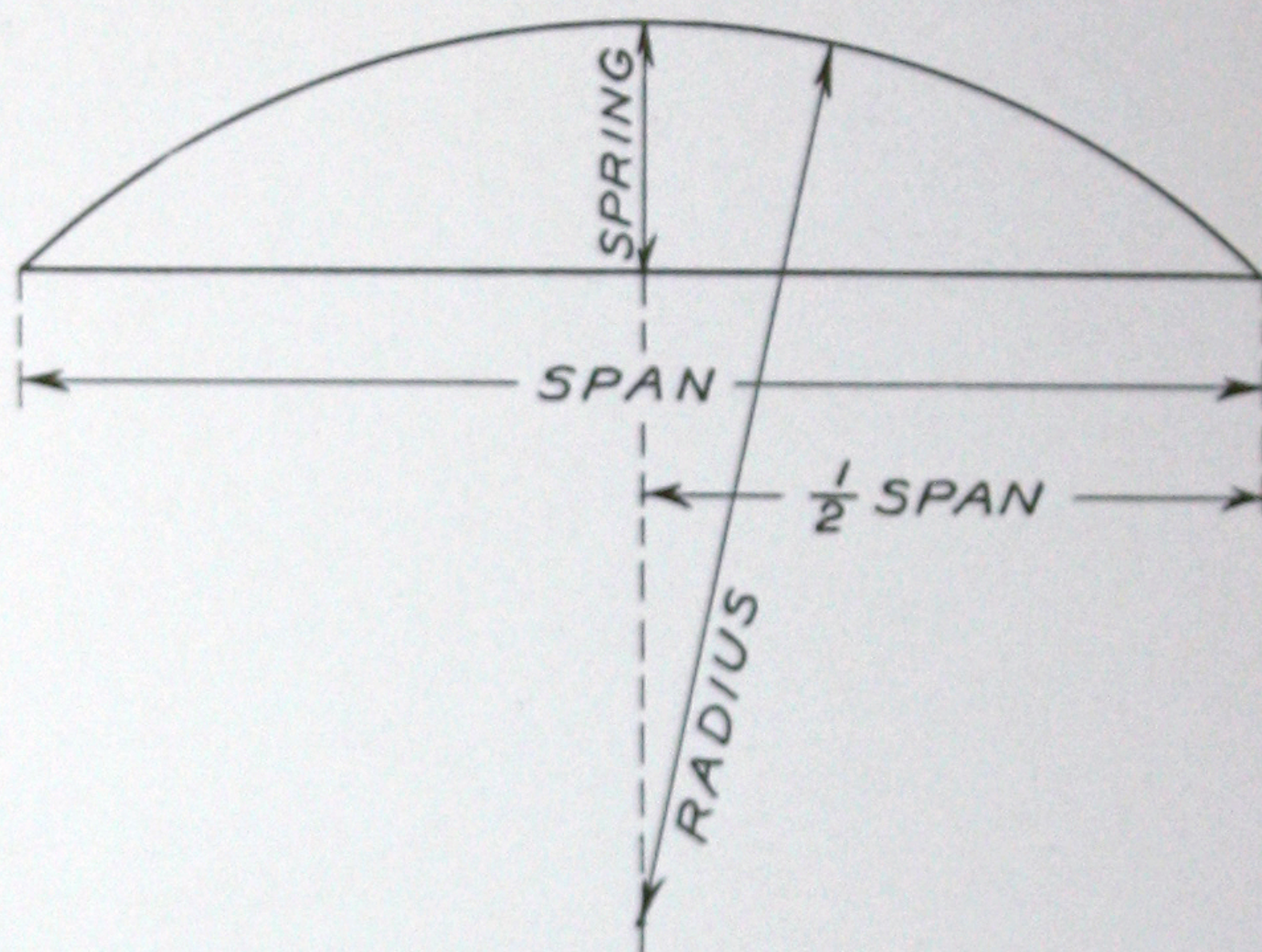
How to Find Radius of Circle When Span and Spring of Arch are Given

To the square of $\frac{1}{2}$ of span, divided by spring, add the spring and divide by 2.

$$\begin{aligned}\text{Span} &= 10' 0'' \\ \frac{1}{2} \text{Span} &= 5' 0'' \\ \text{Spring} &= 2' 0''\end{aligned}$$

Example:

$$\begin{aligned}5 \text{ Squared} &= 25 & 12.5 + 2 &= 14.5 \\ 25 \div 2 &= 12.5 & 14.5 \div 2 &= 7.25 \text{ (radius)}\end{aligned}$$



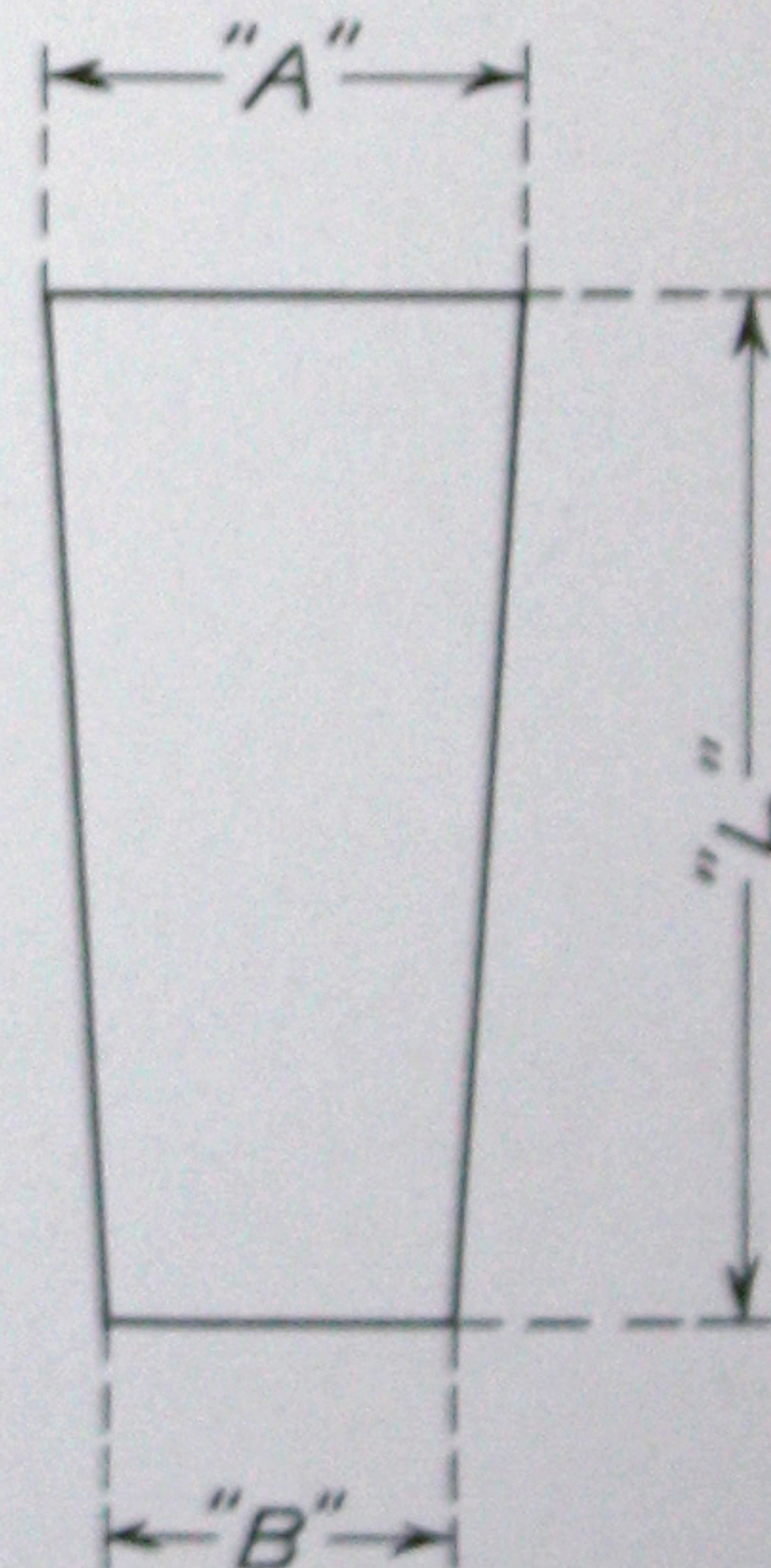
How to Find Inside Diameter of Circle When Size of Brick is Given

Multiply length of tapered section "L" by 2; multiply this product by size of small end of brick "B", then divide by the difference between the large end "A" and the small end "B".

Brooklyn No. 1 Arch

Example: "L" = $4\frac{1}{2}$, "A" = $2\frac{1}{2}$, "B" = 2.

$$\begin{aligned}4.5 \times 2 &= 9 & 2.5 - 2 &= .5 \\ 9 \times 2 &= 18 & 18 \div .5 &= 36'' \text{ Inside Diameter}\end{aligned}$$



The Circle

Circumference = Dia. x 3.1416; Area = Dia. Squared x .7854; or = Radius Squared x 3.1416



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